Net Management section debuts on page 13.

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 4, NUMBER 15 APRIL 13, 1987

▶ *EXECUTIVE SHUFFLE*

IBM exec gets top Rolm slot

Paboojian out; 25-year IBM vet in.

BY MICHAEL FAHEY
Staff Writer

ARMONK, N.Y. — In the latest move to mold its Rolm Corp. subsidiary in its own image, IBM last week replaced Rolm President Dennis Paboojian with a long-time IBM executive who is expected to revamp the PBX maker's manufacturing operations.

Ray S. AbuZayyad, an IBM vice-president and president of IBM's general products division, replaced Paboojian, who took over as president when Kenneth Oshman, one of Rolm's four founders, left over a year ago.

An IBM spokesman said Paboojian left Rolm for personal reasons but will serve as a consultant to IBM, which bought Rolm two and a half years ago. Neither AbuZayyad nor Paboo-

See **IBM** page 35

IBM weaves Rolm into Blue fabric

June 1983: IBM acquires initial 15% stake in Rolm

Sept. 1984: IBM completes buyout of Rolm for $1 25 billion.

In 1985: IBM launches Enterprise Marketing Program, teaming IBM and Rolm reps for marketing to largest customers.

1985/86: IBM policy requires Rolm to hire from within IBM in effort to reduce workforce

Jan. 1986: Rolm President and founder Ken Oshman leaves company, followed by other top executives.

March 1987: IBM absorbs Rolm's 6 000-member sales force

April 1987: IBM replaces Rolm President Dennis Paboojian, longtime Rolm manager, with top IBM executive

▶ *VOICE TRANSMISSION*

MCI takes traffic off satellites

BY BOB WALLACE
Senior Editor

WASHINGTON, D.C. — Less than two years after it purchased Satellite Business Systems (SBS) from IBM, MCI Communications Corp. is pulling its voice users off the three SBS satellites and is actively marketing space on two other satellites, *Network World* has learned.

"We are getting out of satellite communications for voice," said MCI spokesman John Houser. "We don't have any long-range plans for satellite communications in our voice network."

Although MCI declined to comment on plans to migrate away from satellites for data communications services, the program will likely affect the remaining users of SBS' data transmission services.

MCI has already routed 90% of SBS' switched voice communications traffic onto its national fiber-optic and digital microwave network, and the company said that by July, all switched voice traffic would be off SBS 1 and 2 — the two birds carrying that traffic.

The third SBS satellite, SBS 3, is currently providing private networking services for original SBS users such as chemical manu-

See **MCI** page 34

▶ *MANAGEMENT STRATEGIES*

Art of selling

BY BOB HAMEL
Senior Editor

When Richard Colby needed approval to purchase a $52,000 voice mail system, he couched his proposal in terms certain to appeal to upper managers at Johnson Controls, Inc.

"I tried to emphasize how the system would improve customer satisfaction because that's a real hot button for our management," said Colby, who is telecommunications manager at the Milwaukee headquarters of the company.

Colby's story had a happy ending: Senior management approved the voice mail project. It also illustrates how creative communications

See **Selling** page 38

▶ *LOCAL NETS*

LAN Manager to be network standard?

Microsoft targets Novell's turf.

BY MARY PETROSKY
West Coast Correspondent

SAN FRANCISCO — Although IBM has not backed Microsoft Corp.'s new networking software — designed to work hand-in-hand with the operating system that the company codeveloped for IBM's new personal computers — Microsoft officials last week claimed the LAN Manager will become a standard for local net operating systems.

Microsoft executives could not explain IBM's silence on

See **Manager** page 36

NETWORK LINE

News

Mitel bolsters its PBX product line and distribution network with two digital switches and a dealer support program. Page 2.

▼

Leading a trend, Ford Motor Co. will build a T-1 network that will support voice and a packet-switched data subnetwork to connect its locations nationwide. Page 2.

▼

AT&T Communications cites declining rates for its loss of $829 million in revenue in 1986 but dismisses increased competition as a factor. Page 2.

▼

Seeking to add steel to its Centrex services and sway users away from PBXs, the BOCs are pitching central-office based LANs, which have left two trial users with differing aftertastes. Page 4.

▼

Northern Telecom unleashes a low-end PBX with the features found on its mid-range switches. Page 6.

▼

AT&T boosts its Software-Defined Network services, extending SDN's remote access and improving its flexibility. Page 6.

▼

Features

Virtually banded bulk calling services have stolen the limelight from banded WATS by enabling individual users to call anywhere in the country without band restrictions. Page 27.

NEWSPAPER

FEATURE FOCUS

Reaching for the supersmart card

BY CAROLE KNAPP AND JAMES PRINGLE
Special to Network World

A sales representative with an hour layover between connecting flights in Chicago's O'Hare airport stops in a public telephone booth. Inserting a plastic card, he dials a short sequence of numbers and loads a set of updated customer records into the main marketing data base in New York, receiving in turn a list of Midwestern customers to contact while he waits.

In New York, a marketing manager inserts a similar card into a desk phone. A short access code allows her entry to the employee records. Once these are up-

☞ See **Card** page 31

▶ *VOICE/DATA COMMUNICATIONS*

Mitel unveils two new digital PBXs

BY BOB WALLACE
Senior Editor

BOCA RATON, Fla. — Mitel Corp. filled the gaps in its digital private branch exchange product line last week with the introduction of a switch designed to handle 250 to 600 lines and a low-end unit aimed at the under-100-line market.

The PBX maker also launched the Mitel Qualified Dealer program, under which an as yet unspecified number of dealers will sell, support and service the new SX-50 and SX-200 Digital switches, in addition to the older analog SX-100 and SX-200 equipment.

While PBX industry watchers expressed optimism for the future of the SX-50, one said the new SX-2000S Integrated Communications System (ICS) will encounter difficulties competing head-to-head with the newly announced AT&T System 75 XE and Northern Telecom, Inc. SL-1ST (see "NTI offers low-end Sl-1 model," page 6).

Mitel's digital SX-2000S ICS supports 250 to 600 lines and fills the gap between the vendor's SX-200 digital PBX, which handles up to 300 lines, and the SX-2000SG, which supports from 400 to 4,000 lines.

This switch offers all the same features as earlier models of the SX-2000 at a lower cost, the company said. The SX-2000S ICS costs $500 to $700 per line and is available immediately.

The SX-2000S ICS can support remote-switch modules that serve as line concentrators. The SX-2000S ICS' switch features include least-cost routing, message center, speed calling and verified account codes.

The SX-50, a digital replacement for Mitel's analog SX-10 and SX-20 PBXs, supports up to 100 lines and can be used as an end point in a network of Mitel PBXs.

Besides voice, the $475- to $600-per-line switch can be used to switch data using modems, but cannot support both simultaneously. The SX-50 supports the vendor's digital Superset 3 and Superset 4 telephone sets as well as Mitel's analog telephones.

Although the low-end switch cannot support voice and data con-

See **Mitel** page 34

▶ *PRIVATE NETWORKS*

Ford consolidates nets on packet-switched T-1

Voice-data network will reduce costs.

BY BOB WALLACE
Senior Editor

DEARBORN, Mich. — Ford Motor Co.'s recently revealed plan to build a nationwide T-1 network to carry packet-switched data and digitized voice is the latest evidence of what analysts say is a growing trend among large users.

Major corporations, many of them already T-1 users, are realizing the benefits of blending packet-switching technology with T-1 transmission facilities. Vendors are realigning their product lines, hoping to cash in on the trend, analysts say.

Ford, the nation's No. 2 automaker, is building a T-1 backbone network that may eventually link up to 6,000 company sites to its headquarters here. The network will consolidate 28 separate voice and data nets into a single system.

Ford recently signed a contract with M/A-Com, Inc.'s Telecommunications Division for packet-switch gear, which will be used to transmit packetized data over T-1 facilities. Neither Ford nor M/A-Com would divulge the value of the packet-switch gear pact.

As a first step in the project, Ford is currently hooking 22 of its facilities to its corporate headquarters using 41 T-1 circuits. Ford officials said this portion of the net will handle all voice communications and half the data communications traffic of these sites.

Gerald Peterson, corporate system development director for Ford, which spends roughly $100 million annually on telecommunications,

See **Ford** page 36

Network World wants to make its news coverage better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Bruce Hoard toll free at (800) 343-6474.

▶ *AT&T COMMUNICATIONS*

Revenue dips, profits up at long-distance arm

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — Operating revenue for AT&T Communications, Inc. slipped $828.9 million between 1985 and 1986, due in large part to increasing competition and declining rates in the long-distance market, according to industry observers and AT&T last week.

Revenue for the long-distance arm of AT&T for 1986 was $36.6 billion, compared with $37.5 billion in 1985.

Profits for the year, however, were up from $975.7 million in 1985 to $1.35 billion. This was made possible by a $1.28 billion reduction in expenses, according to AT&T Communications' annual financial report filed recently with the Federal Communications Commission.

Unlike the annual report AT&T submits to shareholders, the financial statement sent to the FCC deals only with AT&T Communications and includes much more detail about its various lines of busi-

See **AT&T** page 35

▶ *NETWORK PLANNING*

Users rate IBM PS/2

BY PAULA MUSICH
Senior Editor

In the wake of IBM's Personal System/2 and Operating System/2 (OS/2) announcement, network users are now faced with a multitude of thorny issues concerning how to prepare for and best use the new generation of personal computers and network products.

In assessing the new IBM brood, users need to ask questions such as: How will this affect server needs and technology? Will network performance be affected by the new processors' high speed and multitasking operating system? What kind of applications will make the best use of multitasking capabilities? And will the Token-Ring's bandwidth be big enough to support larger applications and greater network activity?

The promise of the faster Personal System/2, coupled with its multitasking and larger memory addressing capabilities, is expected to eventually eliminate current network bottlenecks at servers and network adapters.

•

Local networks running software written to DOS 3.1, 3.2 and 3.3 and Microsoft's MS-Net are limited today because the operating system standard is single tasking and capable of addressing only 640K bytes of memory.

"The chief limiting factor of LANs today is DOS," said Greg Boyd, vice-president of systems engineering at I-LAN of Columbus,

See **Users** page 35

Table of contents

TOP NEWS

The STC reconsiders the proper role and activities of consultants in the face of questions about ethics. **Page 5.**

COMSAT gets an order from the FCC to refund tens of millions of dollars to users because of excess profits earned from 1983 to 1986. **Page 8.**

The consumer advocacy staff of the California PUC recommends a 30% revenue cut for General Telephone for 1988. **Page 34.**

INDUSTRY UPDATE

The FCC decision that protocol processing is an enhanced service barely opens the doors of competition, say BOCs and industry watchers. **Page 9.**

TELECOM TRENDS

Southwestern Bell tries its ONA in order to identify marketable enhanced services. **Page 11.**

DATA DELIVERY/ NET MANAGEMENT

WSI Corp. supplies weather information to customers with the help of its newly overhauled network and recently added net management center. **Page 13.**

LOCAL NETWORKING

Dedicated servers for local nets may become more popular as prices drop and functions are added. **Page 15.**

COMMUNICATIONS MANAGER

Shared tenant services is alive and well and being promoted by the Multi Tenant Telecommunications Association. **Page 17.**

NEW PRODUCTS AND SERVICES

Dynatech Data Systems and Data Switch Corp. announce enhancements to their product lines at Interface '87. **Page 19.**

FEATURES **Page 24.**

CALENDAR **Page 38.**

Introducing LINK/2. The Total Data/Voice Network Exchange.

Total Intelligence with 4th Generation Technology.

Total Compatibility with Telephone Protocols—DS-1, DACS, D4 Framing and Format.

Total Interface with Digital PBXs.

Total Compatibility with Over 3,000 LINK/1 Systems Installed Worldwide.

Timeplex®

Timeplex, Inc. Woodcliff Lake, NJ 07675 201-930-4600

LINK/1 is a registered trademark and LINK/2 a trademark of Timeplex, Inc.

▶ *LOCAL NETWORKING*

Central office LANs boost Centrex strength

BOCs target data switching on PBXs.

BY JOSH GONZE
Staff Writer

In an effort to counter the threat of digital PBXs and give Centrex some data muscle, the Bell operating companies are ramping up central office local network services.

The technology behind the BOCs' central office local-area network services is not new, though the services themselves are only now becoming available in some BOC regions. Nynex Corp.'s and Bell Atlantic Corp.'s subsidiaries are currently marketing central office local network services, while other BOCs, such as Pacific Bell, are awaiting tariff approval to offer such services. (See related story, below.)

The BOCs have invested heavily in equipment used to supply Centrex services and are hoping to keep users from migrating to digital private branch exchanges, which offer data-switching capabilities.

“The reason we added data capability to our Centrex was so that we could go head-to-head against the digital PBXs of the world,” said Mary Ellen Payne, a product manager for central office local nets at Bell Atlantic.

But many industry analysts are skeptical of the label “local-area network” for the central office services and say their functionality is limited. Users that would benefit from the services, analysts said, are Centrex customers with limited data-switching needs.

“CO-LANs don't provide a lot of the enhanced or added capabilities that you get out of local-area network solutions,” said Brian NeSmith of Network Strategies, Inc., a communications consulting firm. “The equipment used with CO-LANs could be used as an on-premises data switch. It's just an extension that moves data switching to the central office.”

Most of the services employ central office-based Datakit virtual circuit switches offered by AT&T. Datakit is a high-speed packet switch with an 8M bit/sec centralized bus. These switches are modular and can be linked together, so users have flexibility for adds and moves in whatever increments needed, with no maximum number of networked devices. The number of nodes on a local net is finite; Ethernet limits nodes to 1,024.

With Datakit, users vie for a limited number of ports. The ports limit asynchronous devices to transmission speeds of up to 19.2K bit/sec, synchronous terminals to 9.6K and synchronous hosts to 56K bit/sec.

On both baseband and broadband local-area networks, devices share a transmission medium and possess intelligence that lets them pass or retain transmitted data. Speeds are usually much higher. Ethernet, for example, works at a theoretical limit of 10M bit/sec, while token-ring networks transmit at 4M bit/sec.

But Ameritech announced last November it would fund a research effort by David Systems, Inc. to develop a more versatile and faster Centrex data switch. Ameritech has not yet committed to using either Datakit or the product to be developed by David Systems, according to Matt Boxness, product director for central office local networks at Ameritech Services, Inc.

Central office local net services use existing twisted-pair telephone lines to pass both voice and data between workstations through the central office. This star topology creates a single point of potential failure that could take down the entire network.

Baseband local-area networks, in contrast, are inherently reliable because the failure of one component does not compromise the others.

See **BOCs** page 36

▶ *ENHANCED CENTREX*

Users split on CO LAN performance

BY JOSH GONZE
Staff Writer

Two trial users of central office-based local networks agree the service is adequate for simple data switching but are split on its usefulness for more sophisticated applications.

After a one-year test, Kent State University, of Kent, Ohio, is preparing to sign a contract with Ohio Bell that will make the 21,000-student university the first Centrex local net customer in the state of Ohio.

Gary Weber, academic systems manager at Kent State, said the trial showed the service provides performance equivalent to that of terminals hard-wired to a mainframe. “We've been very satisfied. The costs and the service have been very good,” he said.

Kent State, a long-time Centrex customer, uses the service to link roughly 90 personal computers and terminals to one another and to eight larger computers. Each workstation has its own data-over-voice multiplexer, which costs the university about $250 each. Within two years, workstations on the system will number 400.

The university's faculty used to access an IBM 3081, the school's primary research computer, through a pool of 1,200 bit/sec dial-up modems. The Centrex service supports primarily asynchronous data at speeds up to 9.6K bit/sec. “It was an upgrade for most users, who were used to dialing in at very low speed,” Weber said.

Two months ago, Texas Tech University, in Lubbock, Texas, plunged into a central office local-area network trial scheduled to last until September. Steve Strickland, manager of network services at the school, said he is unimpressed by its performance so far. “It's definitely the slowest thing you can get,” he said. “Once you put fancier software on your PC, it goes even slower than 9.6.”

Texas Tech's trial with Southwest Bell involves 40 PCs linked to one another and to two mainframes.

Texas Tech's trial with Southwestern Bell Corp. involves 40 personal computers linked to one another and to two mainframes. Strickland said the university has had to supply its own personal computer software for terminal emulation and file transfer.

Users at Texas Tech have experienced frequent noise on the voice side, which, Strickland hypothesized, originates from the transmission of data. Voice-interference has not afflicted Kent State users.

Strickland also faults the Bell operating company offering for poor device-sharing capabilities. “It's a point-to-point kind of thing. Some other local-area networks might provide you with the capability to share a printer at the same time you're sharing a disk, and that feature is completely absent from [Centrex data switching].”

Each device and host port costs Texas Tech about $20 per month. Strickland said he finds financing the central office service less desirable than paying a one-time charge for an on-premises local-area network.

Neither user has experienced any serious problems with connecting a variety of personal computers or terminals. Kent State found just one, a Tandy Corp. TRS-80, that wouldn't function on the network. “As long as it's a somewhat standard ASCII terminal, we've had no problems with it,” Weber said.

NETWORK WORLD

Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
617/879-0700

Editor
Bruce Hoard
Managing Editor
John Gallant
Features Editor
Steve Moore
Assistant Managing Editor — News
John Dix
Assistant Managing Editor — Production
Lisa Guisbond
Senior Editors
Bob Hamel
Paul Korzeniowski
Paula Musich
Pamela T. Powers
Bob Wallace
Staff Writers
Michael Fahey
Josh Gonze
New Products Editor
Jim Brown
Washington, D.C. Correspondent
Karyl Scott
1273 National Press Building
529 14th Street NW
Washington, D.C. 20045
West Coast Correspondent
Mary Petrosky
3350 West Bayshore Road
Suite 201
Palo Alto, CA 94303
Assistant Features Editors
Bruce Guptill
Robert Mitchell
Associate Editors
Peter Hoffmann
Beth Lazarus
Copy Editors
Joanne McQuaid
Anne Ryder
Art Director
Dianne Barrett
Informational Graphics Designer
Alan Hopkins
Assistant to the Editor
Cheryl Tynan

Publisher
F. Douglas DeCarlo
Administrative Manager
Mary Fanning

Board Chairman
Patrick J. McGovern

Chief Executive Officer
CWCI, Inc.
Axel Leblois

President CWCI-Framingham
Lee Vidmer

Senior VP-Communication Services
Jack Edmonston

Second-class postage paid at Framingham, MA, and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue the last two weeks in December by CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-800-544-3712, within Pennsylvania 1-215-630-9500.

Non-qualified subscribers: $3.00 a copy; U.S. — $95 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

POSTMASTER: Send Change of Address to *Network World*, Box 1021, Southeastern, Pa. 19398-9979.

Copyright 1987 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Network World *is forbidden without written permission.*

ABC

Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

▶*SOCIETY OF TELECOMMUNICATIONS CONSULTANTS*

Members weigh shift in STC's rigid canons

BY BOB HAMEL
Senior Editor

NEW YORK — The Society of Telecommunications Consultants (STC) is weighing changes to its rigid professional standards that could redefine the terms of independent consultancy and the services consultants can offer users.

According to STC President Bruce Nolin, director of information management services for New York-based Arthur Young & Co., a questionnaire has been sent to all STC members, asking whether the STC's definition of what constitutes an independent consultant should be changed. STC members are being asked whether the definition should be broadened to allow consultants to sell products such as software to clients and whether a different membership category should be created that would allow independent consultants to remain "pure," while the other category would include seller/consultants.

The situation is complicated by questions about whether sales activities, if approved, should be widened to include telecommunications hardware, and how the STC will determine when a member crosses the line from being an independent consultant, providing a service, to becoming a vendor, providing goods. STC members will vote on the issue at the society's annual spring meeting, which is being held next month in New Orleans.

The independent consultant

According to current STC bylaws, an independent consultant is a "person who is financially and organizationally independent of any organization that manufactures, distributes or sells telecommunications equipment, devices or transmission services."

On one side of the debate are STC members who feel that consultants should offer advice and education, and nothing else. They say current regulations are designed to protect users by keeping vendors out of the STC. Others say there is no ethical conflict, that users are demanding such things as software and the strictures prevent consultants from responding to those needs.

Regardless of the current guidelines, members contend that some of their peers are already selling products. They also say the STC is unable to adequately enforce the standards.

An STC member, who requested anonymity, asked, "How can a consultant possibly be objective and at the same time supply goods and services of any kind to a client?"

One STC member who is actively and openly selling software to clients is Michael Hills, of Hills Telecommunications Ltd. in Burtonsville, Md. "I don't see any problem in selling the client software as well as advisory services," said Hills. "The whole objective is to do the best job for the client, either by doing the job for him or by providing him with the tools to do the job himself."

The management software that Hills developed is salable to other consultants as a "tool of the trade," under STC guidelines, yet cannot be sold to clients. He said that is unfair.

Hills said there is no difference between giving a client a Lotus Development Corp. worksheet to summarize his information and what his company does, that is, provide management and training software. "We've just taken it to a higher degree of sophistication," Hill said.

Some members said they see the proposed changes opening up consultants' options to include the brokerage of telecommunications hardware. Jay Wheeler, of PHONET-EX of Oakbrook, Ill., described a situation common to consultants.

"If a client wanted me to go to a wholesale place and buy circuit cards, mark the price up by 5% to 10% and pass it along to the him, the client would save about 40% over what he'd have to pay the installer or vendor to put those cards in," Wheeler explained. "Some clients want that, and to have the STC say that I can't continue as an independent consultant because clients might request that of me is silly."

Wheeler said he follows the STC rules to the letter and does not sell hardware. Yet, he said,"If a situation came up where a client wanted me to buy circuit cards or negotiate a deal on equipment, I don't feel I'd be jeopardizing my personal integrity or compromising my client's desire that I be an independent and objective advisor by serving his needs." ☐

IF YOU'VE TURNED T-1 UPSIDE DOWN TRYING TO FIGURE OUT HOW TO AFFORD IT, WE'RE IT.

What you need is our new Intelink.

All the how you need now.

With enough lever forever:

Multitrunk switching *and* single low-speed channel drop *and* insert.

Voice transmission *and* data transmission.

A total system.

With true network control across the entire network.

It's awesable.

At a price that makes it possible.

Call our Len Farias for more information: (401) 884-9075.

Dynatech

Dynatech Communications, Inc.
333 Main Street, East Greenwich, RI 02818

▶ *PBX NETWORKING*

Rolm boosts Redwood

Widens low-end switch's network role.

BY JIM BROWN
New Products Editor

SANTA CLARA, Calif. — Rolm Corp. last week enhanced the networking capabilities of Redwood, its low-end digital private branch exchange that doubles as a key system, to improve its functionality in corporate networks.

The IBM-owned firm also recently announced a digital phone that can be interfaced to a standard asynchronous communications board in an IBM Personal Computer or compatible, including IBM's recently announced Personal System/2.

Redwood's networking enhancements, made possible by the addition of a programmable read-only memory library card, make it easier for Redwood to access features of larger Rolm and non-Rolm PBXs and Centrex services. Prior to the enhancements, Redwood systems could be linked to other PBX systems over tie lines but had limited access to network features.

The board is compatible with three hybrid Redwood models, each supporting between 16 and 144 lines, including the Model I, an entry-level key system, the Model II/Key system and the Model II/PBX. The board adds direct inward system access and remote system management capabilities to all three models and direct inward dialing features to the Model II/PBX.

Direct inward system access enables callers using non-Redwood-attached phones to access Redwood's calling features such as Phonemail, long-distance dialing and internal dialing. Remote system management links the remote-site Redwood system to a central-site IBM Personal Computer-based network management system that is used to configure and monitor Rolm systems.

Direct inward dialing will enable callers to reach Redwood stations without going through an attendant.

The enhanced features will be available on all Redwood models. The cost to upgrade a typically configured existing Redwood system with the new library card ranges from $1,000 to $3,500. A $400 dual-port direct inward dialing board and $450 direct inward system access board are required to gain access to those features from Redwood.

The ROLMphone 244PC is a digital telephone that can be interfaced to personal computers through standard asynchronous communications boards, enabling microcomputer users to tap the data-switching features of the Rolm CBX.

The 244PC complements Rolm's Juniper phone, which requires use of a proprietary Rolm interface board to link to personal computers.

Rolm, by publishing the interface specifications of 244PC, opens the architecture to third-party developers, who can write applications that wed the functionality of the two devices to create integrated voice/data terminals.

Likely by-products, according to Rolm, include packages that will dial telephone numbers from personal computer-based directories and development of a method to pass CBX-issued message-waiting indications to personal computer-resident electronic mail packages.

The actual telephone-to-personal computer interface supports IBM's recently announced Asynchronous Communication Device Interface. The ROLMphone 244PC also supports the Hayes Microcomputer Products, Inc. AT modem command set, allowing common personal computer communications packages to access the CBX telephony and data-switching features.

The 244PC is linked to CBXs over ROLMLink, a high-speed digital link that supports transmission of data and voice over twisted-pair wire. The 244PC supports asynchronous communications at speeds up to 19.2K bit/sec.

The $695 ROLMphone 244PC will support autobaud rate detection, which adjusts to the speed of the communications package or external modem, and an autoanswer feature to allow unattended computers to answer calls.

▶ *SOFTWARE-DEFINED NETWORK*

AT&T adds two new features to SDN

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — AT&T recently added two new features to its Software-Defined Network (SDN) service that are designed to give communications managers greater control over their corporate networks.

In tariff revisions filed with the Federal Communications Commission on April 3, AT&T outlined Network Remote Access, which extends SDN network features to traveling employees, and the Advanced Numbering Plan, which improves the manner in which SDN supports corporate telephone number plans. If approved, AT&T could begin offering the features by May 18.

SDN is a virtual network service that enables customers to extend many of the benefits of private networks to geographically distributed locations using dial-up lines instead of the leased lines used in private backbone nets. The dial-up connections are defined in software in the memory of AT&T switches and only established when a user dials the extension of a remotely located colleague.

Network Remote Access extends SDN to traveling employees by enabling users to access their corporate virtual networks by dialing an AT&T 800 number. After prompting the caller to enter an authorization code, the caller is connected to the nearest SDN node and can complete the call by dialing a company extension.

In private Electric Tandem Networks (ETN) used to link private branch exchanges, customers have to dial into an ETN node and then redial the appropriate number of the remote party, often sacrificing line quality. SDN improves line quality because, after the initial connection is established, the remaining link is brought up through the dial-up network.

Communications managers can determine who will be allowed to make remote calls and which extensions the caller can dial by policing distribution of the three- to 12-digit authorization codes needed.

The SDN feature also gives the manager centralized billing control so he can track calls employees make when out of the office.

The remote access feature can be used for both voice and data calls. The cost for remote access is $1,200 for installation and $3.50 per month. The $1,200 applies for each special switched access code assigned.

"This feature was developed as a result of a customer request," said Glenn Starr, product manager for SDN. "We anticipate that just about every SDN customer will want this feature. It allows the telecommunications manager to screen the off-network calls being made and to regulate who has access to the net."

The other feature announced, the Advanced Numbering Plan, enables communications managers to use a seven- or 10-digit numbering plan for on-network calling. Up until now, SDN customers could only use a seven-digit number for on-network calls.

The cost for the advanced numbering plan will be a one-time $1,150 installation fee and $3.25 per month. AT&T estimates the two features combined will net $2.5 million in revenue in 1987. After-expense earnings will be $308,000, said Starr.

▶ *NORTHERN TELECOM*

NTI offers low-end SL-1 model

SL1-ST gives users mid-line features.

BY JIM BROWN
New Products Editor

Moving to extend the features of its mid-range systems to the low-end market, Northern Telecom, Inc. is today expected to introduce its 32- to 400-line digital Meridian SL-1ST private branch exchange.

Cast as the cornerstone of the firm's 6-month-old Small Systems Program, the SL1-ST is expected to provide low-end users with the same functionality supported on the firm's 400- to 1,500-line SL-1NT and the 1,500- to 5,000-line SL-1XT.

The SL-1ST moves into the market area Northern has served with its 32- to 128-line SL-1S and 80- to 400-line SL-1MS.

With some 90% of U.S. businesses falling into the category, the low-end PBX market has been drawing increased attention from most major PBX makers (see "Mitel unveils two new digital PBXs," page 2, and "AT&T, Northern Tel to address low end," *NW*, April 6).

Northern Telecom is targeting the SL-1ST at key system users looking to upgrade to PBXs and at larger companies that want to incorporate branch offices into their corporate backbone networks. The company said the SL-1ST ranges in price from $550 to $650 per line, including installation of wiring in building walls.

"The SL-1ST will strengthen Northern Telecom's presence in the low-end PBX market," said Greg Carlsted, analyst with Dataquest, Inc. in San Jose, Calif. "It is an extremely robust offering. It's got pretty much everything you'd want. It is more robust in its data communications switching capabilities than either Rolm [Corp.]'s Redwood or AT&T's System 25 were in their initial releases."

The switch will support both analog and digital phone sets over a single twisted-pair wire, but the firm's voice and data SL-1 electronic sets require two twisted pair, one for data and control signals, the other for voice. The firm's digital M2009, M2018, M2112 and M3000 sets will multiplex data and voice together over a single twisted pair.

The switch also supports an optional T-1 interface, the Digital Trunk Interface, and other options such as automatic call distribution and voice messaging.

The SL-1ST also provides direct links to a Hewlett-Packard Co. host over an RS-422 link and to Digital Equipment Corp. VAX minicomputers using DEC's Computer-to-PBX interface. Northern Telecom

See **NTI** page 34

SYNCmodem™ is your SNA or BSC Gateway

Features:
- PC/XT/AT bus compatible
- Auto-dial/auto-answer
- Tone or pulse dial
- Supports Bisync or SDLC links

3 Models:
- **201**
  (2400 baud)
- **212AT/201**
  (1200 and 2400 baud)
- **208**
  (4800 baud)

Description:

SYNCmodem is an IBM PC, XT or AT bus compatible interface card capable of operating as a synchronous modem or as a synchronous interface card.

SYNCmodem is ideal for remote PC-to-mainframe or PC-to-PC communications. It comes fully integrated with 3780Plus™, CLEO-3270 SNA or BSC, and CLEO-5250 SNA software packages.

3780Plus allows fast and efficient file transfers, over common phone lines, between your PC and any micro, mini, or mainframe that supports 2780/3780 Bisync protocol.

CLEO-3270 SNA or BSC and CLEO-5250 SNA allow your PC to emulate a remote 327x or 525x terminal device. All you need is a phone line.

The 212/201 modem includes the Mirror asynchronous software package in addition to your selected CLEO SNA or BSC package.

For details call 1(800)233-CLEO.
In Illinois 1(815)397-8110.

CLEO®

CLEO Software
a division of Phone 1, Inc.
1639 North Alpine Road
Rockford, IL 61107
TELEX 703639

CLEO is a registered trademark of CLEO Software.
SYNCmodem and 3780Plus are trademarks of CLEO Software.

PRIVATE-LINE RATES

Users may get refunds

BY MICHAEL FAHEY
Staff Writer

WASHINGTON, D.C. — In a decision that could lead to refunds for private-line users, a federal court here recently ruled that the Federal Communications Commission improperly allowed local telephone companies to raise local access charges on private lines during 1984 and 1985.

The court ordered the FCC to determine whether private-line providers other than AT&T are eligible for refunds from local carriers and how large any refunds would be. According to an FCC spokeswoman, the FCC will also decide whether private-line carriers must pass on all or part of those refunds to users. The spokeswoman would not speculate on the amount of any refund.

Dispute over special access rates

The dispute centered on proposed special-access increases requested by the local telephone companies in 1983. The FCC opposed the increases for a year on the grounds that they were too high.

But in 1984, the FCC concluded that the existing special access rates were so low they violated the the Communications Act of 1934's prohibition against unjust or unreasonable rates and undue preferences.

In November 1984, the FCC ruled that local exchange carriers could institute a 20% increase in private-line charges. The FCC also directed the local exchange carriers to institute another rate increase, which took effect in January 1985.

MCI Communications Corp. and Western Union Corp. opposed the FCC actions on the grounds that the rate increases were not implemented in accordance with a 1975 agreement between AT&T and the other common carriers. That agreement required that there be six months notice before rate hikes could go into effect.

Moreover, the agreement stipulated that rate increases be supported by cost data.

FCC met cost-justification rules

The court found that the FCC met the 1975 agreement's requirement for cost-justification information. However, the court also ruled that the rate increases took place without the required six months notice.

More news: page 34

Now Your Small PC Network Can Have Big Network Connections.

CROSSTALK® Network Version opens a wide world of communications potential for any user on your IBM PC Network, Token Ring Network, or other NETBIOS-compatible network. Any computer on your network can share 1 or 2 modems and phone lines, plus something just as important—the flexibility and range of communication that CROSSTALK is famous for.

CROSSTALK gives any workstation a wide range of terminal emulations and protocols, to allow file transfer with other PCs, other PC networks, minis, and mainframes. It also speeds error-checked file transfer within the network, at high speed, without going through the server. Our network version has all the user convenience you've learned to expect from CROSSTALK. Menu or command. Help system. Simple language. Automated script files. Ask your dealer about it. Or write for details.

CROSSTALK
NETWORK VERSION

Digital Communications Associates, Inc./1000 Holcomb Woods Parkway
Roswell, Georgia 30076/1(800)241-6393

CROSSTALK is a registered trademark of Digital Communications Associates, Inc.

OVERCHARGES

COMSAT hit for $62m in refunds

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The Federal Communications Commission recently ordered Communications Satellite Corp. to refund to users $62 million in excess profits it earned from 1983 to 1986.

The FCC said COMSAT earned more than the 12.48% rate of return allowed under FCC rules, and the commission gave the company 45 days to oppose the ruling or say how the money will be refunded. The FCC also said it is currently investigating whether COMSAT earned excess profits prior to 1983.

The FCC action stemmed from an investigation of complaints from users of COMSAT international satellite transmission services, including Federal Express Corp., MCI Communications Corp., ABC, CBS and NBC. The complaints were filed with the FCC after COMSAT revised its tariffs for international services in 1984.

Although the FCC allowed the COMSAT tariffs to take effect subject to investigation, the commission had raised doubts about the tariffs before complaints were filed and had asked COMSAT to file additional cost support material.

As a result of the inquiry, the FCC ordered COMSAT to recalculate its rates to correct some faulty accounting practices. The FCC will also require carriers that COMSAT serves to pass the refund on to their customers, according to Stan Wiggins, an analyst with the FCC tariff division.

"This action is unjustified and unwarranted both on the facts and the law," according to a COMSAT statement. "This is the latest example of an FCC theory that it can recover so-called excessive earnings from past periods. This theory is being challenged by virtually all domestic carriers in court."

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

Use the
attached form
to get your own
FREE subscription
to
Network World.

You can also use the form to make any necessary changes to your name and address.

INDUSTRY UPDATE

Tel Plus to continue marketing NEAX2400

On the heels of its acquisition of Tel Plus Communications, Inc., the nation's largest independent distributor of telecommunications systems, Siemens Information Systems, Inc. signed an agreement with NEC America, Inc. under which Tel Plus will continue to market NEC's NEAX2400 Information Management System. The three-year sales pact will allow Tel Plus to distribute all models of the private branch exchange. Siemens, which also sells PBXs, said Tel Plus will continue to offer other vendors' products.

▶ *FEDERAL COMMUNICATIONS COMMISSION*

Protocol verdict disappoints BOCs

Decision seen as middle-of-road stance.

BY PAM POWERS
Senior Editor

The Federal Communications Commission's decision on protocol processing has cracked open the door to competition and effective data service offerings but did not achieve as much as the Bell operating companies and industry analysts hoped it would.

As part of the Third Computer Inquiry, the FCC mandated recently that the BOCs could perform protocol processing without a separate subsidiary but that such services would still be qualified as "enhanced," rather than basic to public packet net offerings.

While the BOCs and analysts said the effect of the decision is still unclear, most BOCs expressed disappointment over the FCC's middle-of-the-road stance, saying it would hinder efficient provision of data services.

"We spent a lot of time trying to prove to the FCC that protocol processing is more economical when offered as part of an integrated basic service," said Wayne Masters, district manager for federal regulatory document management with Southwestern Bell Corp. "The decision imposes lengthy reporting procedures on us, which will add cost to our product," he said.

Doug Springfield, a product manager for BellSouth Corp., agreed that the decision will lower the BOC's efficiency in bringing services to market. "The required regulatory filings like comparably efficient interconnection are stringent," he said.

"The process is still an onerous one for the BOCs to deal with," said Doane Perry, senior analyst with Framingham, Mass.-based International Data Corp. Perry said the decision unfortunately will do little to expedite efficient packet services from the BOCs, which would in turn stimulate the entire market for packet-switching products and services.

Page Montgomery, vice-president with Economics & Technology, Inc., a Boston-based consulting firm, expressed concern that the ruling may allow the BOCs to file for services at the state, rather than the federal level, a move that could end up in chaos.

"The BOCs' versions of comparably efficient interconnection or [Open Network Architecture] at the state level could vary widely, and that will cause significant compatibility problems," he said.

See **Protocol** page 10

▶ *ACQUISITIONS*

Infinet to merge with Tesdata

BY PAM POWERS
Senior Editor

NORTH ANDOVER, Mass. — Infinet, Inc. said recently it intends to merge with financially troubled Tesdata Systems, Inc., whose network performance monitoring product Infinet has resold for the past year.

The agreement, subject to shareholder approval in July, would make Tesdata a wholly owned subsidiary of Infinet through a convertible debentures swap.

Based in Herndon, Va., Tesdata has marketed the Smart network performance monitoring system to end users and more recently to other vendors for resale.

See **Infinet** page 10

Growth of BOC access lines

	4Q 1986	4Q 1985	Percentage change
Pacific Telesis Group	12,036	11,630	3.72%
BellSouth Corp.	15,046	14,532	3.54%
Bell Atlantic Corp.	15,509	15,090	2.78%
Nynex Corp.	13,962	13,623	2.48%
Southwestern Bell Corp.	11,083	10,898	1.70%
US West, Inc.	11,332	11,167	1.47%
Ameritech	14,755	14,555	1.37%

SOURCE: THE E.F. HUTTON GROUP, INC., NEW YORK

BRIEFS

Centel Corp. said it expects a decrease in first-quarter 1987 earnings compared with $1.11 per share in 1986. The forecasted decline is attributed to adverse regulatory constraints and major acquisitions in 1986. Centel also asked shareholders to authorize an increase in common shares from 40 million to 120 million.

Cincinnati Bell Telephone acquired **Auxton Computer Enterprises, Inc.** in a transaction valued at $86 million. Auxton, with 1986 sales of $36 million, markets data processing consulting services and proprietary applications software packages.

Atlantic Research Corp. (ARC) announced the completion of its merger with **ORI Group,** a professional services firm. ARC said it will reorganize into two divisions, one concentrating on products, the other on professional services. The company recently fought off an unsuccessful takeover attempt by defense contractor **Clabir Corp.**

Gandalf Data, Inc. formed an alliance with **Data Voice Solutions Corp. (DVSC),** which markets an MS-DOS multiuser computer system that functions as a local net. Gandalf will integrate the system with its PACXnet data

See **Briefs** page 10

INDUSTRY EYE

PAM POWERS

Siemens to face formidable foes in packet net entry bid

Siemens Data Switching Systems, Inc.'s move into the private packet network market underscored the blossoming respect for that business in the U.S. But although the field is just now basking in attention, several large vendors with well-established positions are set to thwart Siemens' attempts.

Siemens stood on the periphery of the private packet market for several years, of its own volition. Rather than addressing the needs of the large corporate user, the telecommunications concern was convinced the spoils lay with the Bell operating companies' then-nascent plans to build intra-local access and transport area packet nets.

Siemens fared well in its penetration of BOC accounts: The company claims it owns 60% of that market. But the BOCs' plans for deploying packet networks still haven't taken wing, and Siemens was left lamenting its misfortune in a market that is not yet large enough to provide a boost to the company's bottom line.

Now Siemens has reassessed its strategy. Its migration to the private arena makes sense, but there are hidden risks.

Analysts have for several years glibly projected 30% growth rates for private packet nets. Those projections are often heavily based on the vendors' expectations, which are forgivably optimistic. The fact is, 1986 was at best a slow growth year for some vendors, at worst a flat or down year for the less fortunate.

The prospects for 1987 are better, but Siemens is faced with formidable competition. Telenet Communications Corp. and BBN Communications Corp., both successful players in their own right, have aligned with T-1 networking vendors to expand their offerings further. M/A-Com, Inc. has a highly competitive product line, as does Telematics International, Inc. Tymnet/McDonnell Douglas Network Systems Co. and Northern Telecom, Inc. further fragment the market.

But with a more complete product line, including low-end switches and packet assembler/disassemblers, Siemens probably stands an equal chance in the scramble for market share. As Tom Papa, Siemens' vice-president of sales, emphasized last week, Siemens has a worldwide presence that gives it an edge over competitors in multinational bids. And the company's enormity, with more than $28 billion in annual sales, makes it a force to be reckoned with.

Briefs from **page 9**

switch. Gandalf made a minority equity investment in DVSC as part of the agreement.

M/A-Com, Inc. signed a contract with **Ford Motor Co.** to provide the automaker with a private packet-switching net that will provide centralized control and management of all non-SNA networks in the company. The size of the contract was not disclosed.

Additionally, M/A-Com elected Thomas F. Burke president and chief executive officer. Burke, who joined the company in 1961, had been chief operating officer since November and was previously vice-president for administration and finance.

Rabbit Software Corp. said it will merge with **CTi Data, Inc.**, a Raleigh, N.C.-based gateway products company.

Computer Sciences Corp. signed a contract for $800,000 with the General Services Administration to provide transmission support of the agency's data traffic.

Cylix Communications Corp. was awarded a contract by **Quality Carriers, Inc.** for the installation and management of a value-added network. Terms of the contract were not disclosed.

TelWatch, Inc., a Boulder, Colo., network management equipment vendor, named as its president and chief executive officer James D. Edwards, a former senior vice-president of AT&T.

Telenet Communications Corp. signed a three-year contract with **Florists' Transworld Delivery Service Association (FTD).** Under the contract, FTD will remarket Telenet's transaction processing service, TeleCard, to FTD's 23,000 members.

PicTel Corp. announced a public offering of 1,050,000 units of common stock at $6 per unit. Proceeds will principally be used for product development, marketing, capital equipment and working capital requirements. ◘

Protocol from **page 9**

But the abolition of the separate subsidiary rule may also have some positive effects. "The decision should make operations less expensive for the BOCs," Montgomery said. "I think it will increase competition."

Gerald Mayfield, a vice-president with DMW Group, Inc. in Ann Arbor, Mich., said the decision to keep protocol processing an enhanced service is important to future competition. "It's crucial that the BOCs be made to account for their costs. We have to prevent cross-subsidization in order to protect other service and equipment vendors in the market," he said.

Competition will be further heightened, Mayfield said, when companies like Tymnet/McDonnell Douglas Network Systems Co. and Telenet Communications Corp. demand space in BOC central-office switch sites to place their own packet equipment. He projected that since the BOCs can now collocate equipment, the FCC will rule that competing vendors also be given space at the central office.

But John McQuillan, an independent consultant in Cambridge, Mass., said the FCC has exhibited little knowledge of how to build competition in the data services arena. "The decision makes the market less efficient than it would be otherwise," he said. "It handicaps the BOCs as new entrants and protects Telenet and Tymnet, the dominant suppliers." ◘

Infinet from **page 9**

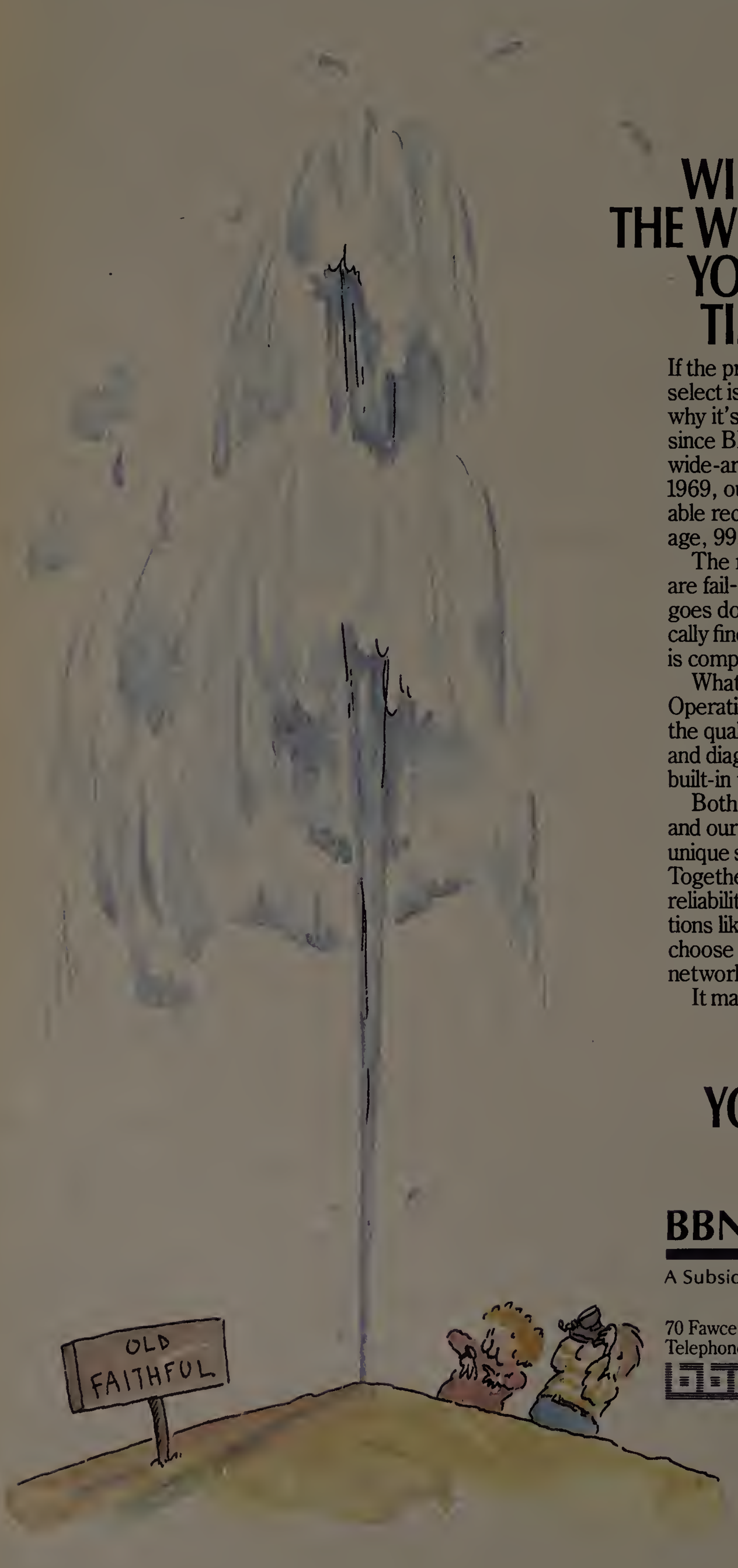
The company, which averages annual sales of $5 million, "has not been well-off financially," admitted William McCarthy, who was elected president of Tesdata last week, subsequent to the resignation of Thomas E. Stone. McCarthy is currently, and will remain, vice-president of business development at Infinet. Stone remains a director at Tesdata.

"Part of the reason Infinet bought Tesdata was because the company's health was poor," McCarthy explained. "The Smart system is key to Infinet's long-term strategy, so it was important that Tesdata remain viable." Other Tesdata officials declined to comment on the proposed merger plans.

Infinet sells the Smart system as part of an integrated network management package bundled with its Series 90 network management system. McCarthy said Tesdata's sales were low prior to the OEM agreement with Infinet because users did not want to buy a stand-alone performance measurement product without control and management features.

Infinet has dedicated the past year to expanding its product line through various OEM arrangements. McCarthy said the goal is to make available to the user an integrated set of products that provide a complete networking solution.

The company has resale agreements for modems and multiplexers with Infotron Systems Corp., Memotec Data, Inc., Concord Data Systems, Inc. and others. ◘



WILL YOU CHOOSE THE WIDE-AREA NETWORK YOU CAN RELY ON TIME AFTER TIME?

If the private wide-area network you select isn't reliable, it isn't anything. That's why it's comforting to know that ever since BBN Communications built the first wide-area packet-switching network in 1969, our systems have delivered an enviable record of availability—on the average, 99.99%.

The reason is simple. BBN networks are fail-safe. If a telecommunications line goes down, our packet switches automatically find an alternate route, and the change is completely transparent to the user.

What's not transparent is the Network Operations Center. Here you can monitor the quality of service using on-line reports and diagnose and isolate failures using built-in tools.

Both our alternative routing approach and our Network Operations Center are unique strengths of BBN Communications. Together they represent a commitment to reliability that convinced major corporations like MasterCard and Wang to choose BBN as their private wide-area network company.

It may well be the reason you should, too.

SHOULDN'T YOU BE TALKING TO BBN?

BBN Communications

A Subsidiary of Bolt Beranek and Newman Inc.

70 Fawcett Street, Cambridge, MA 02238
Telephone 617-497-3268 Telex 921470

TELECOM TRENDS

Software gives users worldwide telex

ITT World Communications, Inc. announced Office Access, software that enables users of Wang Laboratories, Inc. VS computers to access the worldwide telex network and electronic mail systems.

Users of Wang WP, WP Plus, DP and Wang Office applications can send and receive messages from their own terminals. The service provides all message formatting, document conversions and telecommunications functions.

COMPUTER III

SW Bell tests ONA plan

Will identify basic service elements.

BY KARYL SCOTT
Washington, D.C. Correspondent

LOS ANGELES — Southwestern Bell Telephone Co. recently became the first regional Bell holding company to announce an Open Network Architecture (ONA) trial.

The announcement here coincided with the ONA Forum held by the RBHCs and Bell Communications Research, Inc., also in Los Angeles. The trial, now in progress, is designed to help Southwestern Bell formulate an ONA plan in compliance with the Federal Communications Commission's Third Computer Inquiry rules.

AT&T and the Bell operating companies must submit ONA plans to the FCC by February 1988. The ONA plans will identify enhanced services the BOCs plan to offer and the basic service elements or building blocks that make up those services. The plans will also explain how the BOCs will provide those service building blocks to enhanced service providers that use BOC networks.

ONA is a regulatory requirement

See **ONA** page 12

CROSS TALK

BOB WALLACE

Long-haul losses, PBX pitches

Consolidation in the long-haul industry may be the only way for many of the smaller companies to survive, but even mergers and acquisitions take their toll.

ALC Communications, parent company of the fourth-largest domestic long-distance service provider, **Allnet Communications Services,** recently reported a loss of $60.8 million on total revenue of $49.7 million for the year ending Dec. 31, 1986.

The carrier claimed the 1986 loss was due in large part to fourth-quarter actions necessitated by the merger that formed the company, the combination of Allnet and Lexitel Corp., in December 1985. Charges resulting from the consolidation of switching centers and equipment write-downs account for $35.6 million.

Have any large private branch exchange vendors taken the management structures of user corporations into consideration when forming their elite, large-account teams that often provide both voice and data equipment to these firms?

Based on numerous user interviews conducted over the past three months, many large user corporations have yet to integrate voice and data in one department. Many data processing departments report to MIS managers, while telecommunications managers report to separate managers.

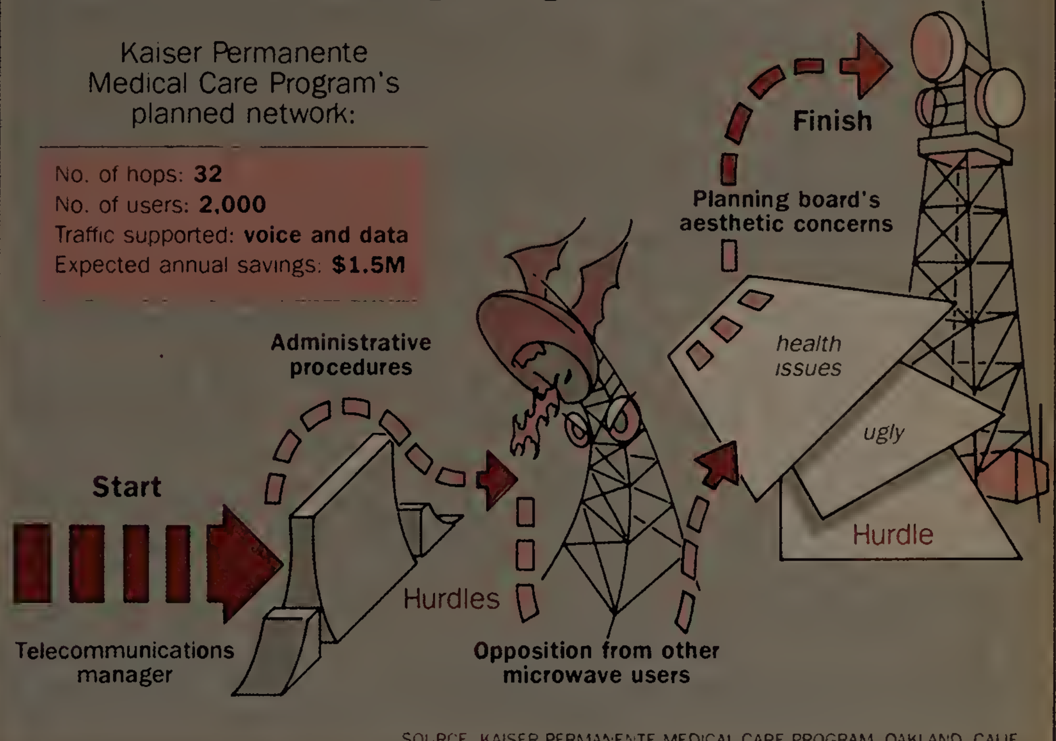
These vendors may have jumped the gun in forming the voice/data communications SWAT teams. Example user scenario: **IBM/Rolm's Telecommunications Marketing Services (TMS)** organization, equipped to provide total voice and data communications systems calls on User X, which has separate voice and data departments, each of which report to different keepers. To whom do the TMS group's members make their pitch?

Do they make one pitch to each department head and then one pitch to each group's higher-ups? Will these marketing groups go over the heads of voice and data communications managers in an attempt to circumvent the problem?

Do the telecommunications managers get to hear the data pitch? Do the MIS managers get to hear the telecommunications presentation? Or are all these operatives put in one room for a single pitch to both voice and data managers?

The success of these PBX vendors' integrated voice/data marketing teams will likely hinge on the speed with which large user corporations integrate management of voice and data. ☒

Obstacles to building a digital microwave network


Kaiser Permanente Medical Care Program's planned network:
No. of hops: 32
No. of users: 2,000
Traffic supported: voice and data
Expected annual savings: $1.5M
Start
Telecommunications manager
Administrative procedures
Hurdles
Opposition from other microwave users
Planning board's aesthetic concerns
health issues
ugly
Hurdle
Finish

SOURCE: KAISER PERMANENTE MEDICAL CARE PROGRAM, OAKLAND, CALIF

PRIVATE NETWORKING

Obstacles delay microwave net

Kaiser nears end of year-long net battle.

BY MARY PETROSKY
West Coast Correspondent

OAKLAND, Calif. — Licensing snags, complaints about the aesthetics of antenna towers and opposition from other microwave users were unforeseen obstacles that delayed the completion of a private microwave network here by more than a year.

Kaiser Permanente Medical Care Program, a health care provider, has installed microwave equipment at 16 local facilities slated to be part of its private voice/data network. However, the company will not cut over the network until four remaining sites in the San Francisco Bay Area are cleared for operation.

The all-digital network, which is expected to save Kaiser $1.5 million annually, will enable roughly 2,000 terminal users to access data on patients — including appointments and histories — maintained at a single data center. The net will also support voice communications between health centers, according to Joseph Beaupre, director of telecommunications for Kaiser's Northern Region.

Problems delaying completion of the 32-hop microwave network stemmed primarily from opposition from other microwave users and concerns by local planning boards about microwave towers, Beaupre said. Kaiser also needed to clear all its plans — including revisions — through the Office of Statewide Health Planning and Development (OSHPD), a California agency that regulates the state's hospitals. As a result, Beaupre missed his original target date and is now looking to have the network operational in October.

Kaiser originally considered installing a private microwave network in the early 1970s, but restrictions in connecting to the public network and high costs made the technology uneconomical, Beaupre said.

By the beginning of the 1980s, the idea of a private microwave network began to look more economically feasible because Kaiser's volume of traffic had increased significantly and the cost of installing microwave networks had come down.

Beaupre estimates that the $10 million microwave network will pay for itself in four to five years and save Kaiser $15 million over 10 years. The network is being built by radio equipment maker Avantek, Inc., which subcontracted out for other net components, such as the antenna towers. Kaiser currently pays $250,000 per month for leased voice and data circuits to connect the health facilities.

Besides providing greater reliability than the leased-line net, Beaupre said the 45M bit/sec microwave network has 15 times greater capacity. Although this ca-

See **Microwave** page 12

Net control from **page 13**

the company plans to build its first network management center. "Users are feeling the effects of divestiture," noted Norman G. Gentry, communications manager at the company. "They are being forced to supply carriers with more and more information about line problems."

Currently, WSI relies on its local carrier, New England Telephone, and long-distance carrier, AT&T, to resolve network problems. WSI is not a large enough customer to warrant an on-site support person from either AT&T or New England Telephone. Instead, support is handled by each company's telemarketing support center.

Each time WSI calls AT&T, it deals with the same person. Whenever New England Telephone is summoned, however, WSI works with a different person. "Working with one person is much easier than dealing with whoever picks up the telephone," Gentry said.

Such things as dealing with different support technicians helped convince WSI officials of the need to set up the support center. Last July, Gentry was lured away from Codex Corp., where he was working as an engineer in the network management group, to WSI to oversee the network overhaul and establish the control center.

The net overhaul stemmed from WSI's desire to move its services closer to its customers. The company's central office in Bedford is tied by leased lines to the data processing center in nearby Reading, Mass., where Digital Equipment Corp. VAX minicomputers produce the graphic weather information seen by millions of television viewers each day.

The central site was linked to remote sales offices, customer sites and weather service offices in New York, Washington, D.C., Atlanta, Chicago and Kansas City, Mo., by leased lines operating at speeds of 9.6K and 14.4K bit/sec. Codex multiplexers and modems were used to transmit the necessary data.

With the overhaul, the company planned to tie other offices in Dayton, Ohio, Omaha, Neb., and El Segundo, Calif., to the network. WSI also wanted to increase the number of leased lines between offices and install new multiplexers and modems with more diagnostic capabilities than the Codex Corp. products the company was using.

The first stage in the revamping was selecting new modems and multiplexers. Gentry invited Codex Corp. and Racal-Milgo, Inc. to bid for the contract. "We view those two companies as the industry's leading suppliers," he said.

The communications manager met with both companies but never heard from Racal-Milgo after an initial meeting. "A multiplexer or modem would have to support our proprietary graphic data stream," Gentry said. "Codex's product can work with it, but Racal-Milgo may have seen that its equipment might have trouble supporting the data stream."

The communications manager made it clear to the vendors that the company that won the first portion of the overhaul would probably also win the network management portion. "We want to work with as few vendors as possible, and we don't want to mix modems, multiplexers and net management systems," Gentry said.

> The net overhaul stemmed from WSI's desire to move its services closer to its customers.

In the next few months, WSI plans to install the new modems and multiplexers at various sites. Once the equipment has been installed, the company will turn its attention to the network control center. Space has already been allocated for it, and last fall WSI added another communications technician whose job is to oversee the center's installation.

"Finding the right person was very difficult," Gentry noted. "Most candidates are skilled in only one type of equipment. We were looking for someone with a broad background." The company hired a college graduate with a degree in electronic engineering.

A network control center represents a major investment, which many medium-sized businesses typically can't justify. But Gentry said WSI's president fully backs the project.

To help cement the decision, the communications manager has been quietly selling the network management system to the president. Whenever a problem crops up that could have been solved by a network management system, Gentry casually mentions it to the president.

"A communications manager's job is to educate upper management and sell them on the need for a network management system," he said. ◪

The 15-Minute Data/Voice Network

Line Miser™ Converts Your Ordinary Phone System Into a Local Area Network

Now you can turn your phone system into a versatile local area network (LAN) for data and voice. It's as easy as plugging in a new telephone. And it takes about that long, too.

Gandalf's new Line Misers enable you to use your existing phone wiring for **simultaneous** voice and data communications. They function as limited distance modems that pass voice transparently. Simple bandwidth allocation is used to separate the data from the voice. Should your PBX fail, the data will not be affected.

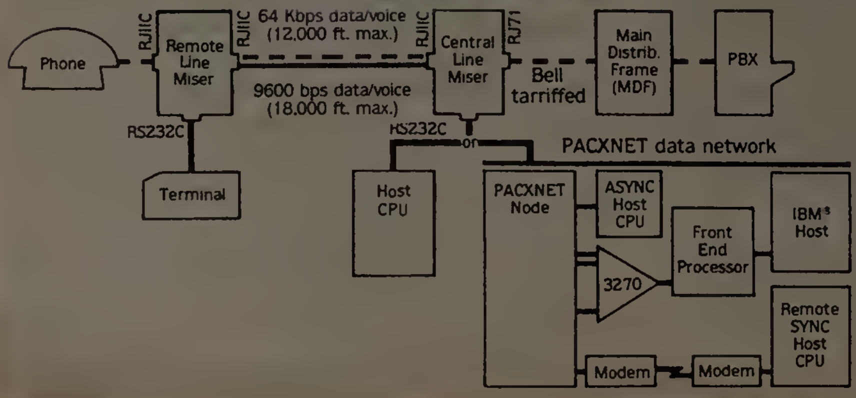
Line Misers provide a fast, cost-effective means of expanding your data terminal network — up to 18,000 feet. Everywhere you have a telephone, you can quickly and easily add a terminal. It's a plug-in job — all you need is a power outlet and a phone jack. No more 4-wire dedicated data lines! Asynchronous full-duplex data rates up to 19.2 Kbps can be handled. Also supports synchronous data at speeds up to 64 Kbps.

What's more, all Line Misers are FCC registered. Gandalf Line Misers let you create your data-over-voice LAN in record time and at a price you can afford. Call your local Gandalf sales representative for details today.

gandalf®

Nobody Supports Networking Like Gandalf.

High speed and rackmount units also available



USA Gandalf Data, Inc. (312) 541-6060
Canada Gandalf Data, Ltd. (613) 226-6500
Holland Gandalf Nederland (020) 867611
Australia Gandalf Pacific Pty. Ltd. 61-2-419-5977
U.K. Gandalf Data Communications Ltd. (0925) 818484

Subsidiaries of Gandalf Technologies Inc.

LOCAL NETWORKING

Nestar unveils workstation trio

Nestar Systems, Inc. jumped on the diskless workstation bandwagon with the introduction of three workstations for its PLAN Series of personal computer networks. The IBM-compatible workstations, available in ARCnet and Token-Ring configurations, are based on the Intel Corp. 8088, 8088-II and 80286 microprocessors. They include 640K bytes of memory, a graphics adapter, a keyboard and a network adapter card. Prices range from $895 to $1,695, and the workstations are available now. For more information, call (415) 969-1777.

MARKET STUDY

LAN server sales rise

Technology expected to mature in near future.

BY MARY PETROSKY
West Coast Correspondent

The growing use and sophistication of local networks is translating into increased sales of dedicated servers, which experts believe will evolve over the next few years to incorporate functions such as data base management and gateways to other environments, even as prices for the products drop.

Until recently, users shied away from dedicated servers, such as those offered by 3Com Corp. and Novell, Inc., in favor of using IBM Personal Computer ATs or compatibles as servers, server vendors acknowledged. "As recently as a year ago, people attributed a low value to a dedicated network server," said Bob Bressler, vice-president and general manager of the Applications Software Division of 3Com in Santa Clara, Calif.

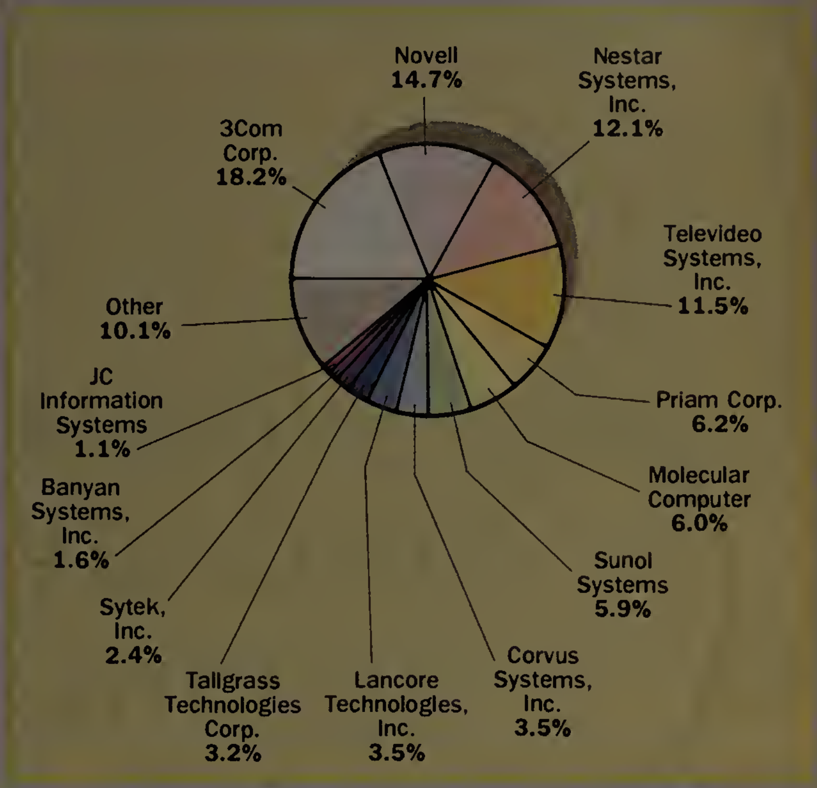
Bressler's view is borne out by a study recently released by Framingham, Mass.-based International Data Corp. This study indicates there is currently only one dedicated server used in every three local networks installed.

But that is changing. The market for dedicated servers is heating up, said Doug Gold, a senior research analyst with IDC's Communications Industry Research Group. Gold estimated the server market will grow at a compound annual rate of 41% through 1991, when there will be one server for every two local nets installed.

IDC defines a network server as a specialized node on the personal computer network dedicated to providing file management for central storage, backup and distribution of network files. In addition, the server can handle modem pooling and run communications software that pro-

See **LAN** page 16

Worldwide installed base of personal computer network servers



NOTE: This includes OEM companies and those that sell their servers to systems integrators.

SOURCE INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

LANMARKS

PAULA MUSICH

Images of Interface '87

Interoperability was foremost in the minds of recent Interface '87 attendees, whether they were users, vendors or conference speakers.

According to Interface exhibitors, interoperability of equipment is just around the corner. Touch Communications, Inc. demonstrated its Open Systems Interconnect (OSI) software, which supports "transparent" communications between an IBM Personal Computer AT, a Digital Equipment Corp. MicroVAX II, a Texas Instruments, Inc. BusinessPro and a Compaq Computer Corp. 386. Of course, where the OSI specifications were incomplete, such as those regarding the user interface, Touch filled in the gaps with proprietary software.

Also, Spectrum Concepts, Inc. announced what it regards as the first turnkey LU 6.2-based application to allow peer-to-peer communications between different classes of computers running different operating systems from different vendors.

Spectrum, too, added proprietary touches to its implementation of IBM's de facto communications protocol.

The reality for users at the show — even the more sophisticated — seemed to be much less dramatic. Most users' experiences with multivendor communications seemed to center on a less functional but widely implemented technology: terminal emulation.

For speakers, a common theme was, "There's still a lot of work to be done before true [meaning open] multivendor interoperability is achieved." For example, if you asked speaker Richard Miller of Telematics International, Inc. whether we can see the light at the end of the OSI specifications tunnel, he'd probably tell you we can't even see the tunnel.

Perhaps the real progress is being made by users themselves in learning about standards and data communications technology. Several vendors remarked that they observed quite a difference between this year's attendees and last year's in the level of understanding they brought to the show.

Perhaps as a result of this increasing knowledge and the availability of new standards-oriented products, next year's attendees will be able to swap stories about their experiences with true interoperability.

SUN MICROSYSTEMS

Tool kit expands PC net line capabilities

BY PAULA MUSICH
Senior Editor

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. last week bolstered its PC-NFS networking software with the introduction of a toolkit that aids in developing distributed applications. Also announced were enhancements that provide support for additional networking protocols and additional Ethernet adapter cards.

PC-NFS runs on IBM Personal Computers and compatibles and allows them to access files and peripherals on an Ethernet network running Sun's Network File System. The company's new PC-NFS Programmer's Toolkit allows distributed, multiuser applications to be developed that can run across personal computers under Microsoft, Inc. MS-DOS, Unix and other operating systems linked in an NFS network. The networked applications operate over any Ethernet network employing NFS protocols, a Sun spokesman said.

The spokesman said the toolkit could be used to develop such applications as a distributed data base management system that can be spread throughout personal computers or other workstations in an NFS network.

PC-NFS enhancements, provided in Release 2.0 of the software, include support for MS-DOS 3.1's file- and record-locking capabilities and file transfer protocol, and support for Ungermann-Bass, Inc. and Micom-Interlan, Inc. personal computer network adapters. The software previously supported only 3Com Corp. Ethernet cards. The software is available now for $395.

The toolkit, which runs on IBM Personal Computers, XTs, ATs and compatibles running DOS 3.0 and PC-NFS 2.0, will be available in May for $595. A site license for unlimited use is $2,395.

One of the first applications to be written using the toolkit is Cupertino, Calif.-based Network Innovation Corp.'s Multiplex. The program, which runs on IBM Personal Computers, Sun workstations and other machines in an NFS network, links personal computer applications to multiuser data bases and applications. Personal computer applications can include Lotus Development Corp.'s 1-2-3 and dBASE from Ashton-Tate.

The software allows a 1-2-3 user to browse data bases interactively on systems linked to the network and use a row and column format to select and extract data. The software is available on a Sun-3 host for $2,000.

LAN from **page 15**

vides gateways to other networks and systems.

Most market watchers, including the Seybold Group, Inc. of San Jose, Calif., see the server market divided into three areas: the low-end IBM Personal Computer AT-based server; dedicated servers built on a Motorola, Inc. 68000 microprocessor or IBM Personal Computer AT base; and minicomputers used as servers.

Users with small networks of six to eight nodes tend to use IBM Personal Computer ATs and compatibles for servers, said Bob Clark, vice-president of Seybold's Consulting Division. For these users, "dedicated servers are not very important," Clark said. In this segment of the market, "we're going to continue to see consumption of MS-DOS as the primary operating system," he added.

As local networks grow to 30 or 40 nodes, an IBM Personal Computer AT becomes impractical as a server. "You need more processing power," Clark said. Likewise, minicomputer-based solutions are impractical for most users because they are expensive, Gold said.

For the immediate future, the mid-range of the market — the dedicated server — is where most action will take place, industry watchers and participants agreed. IDC estimated prices of dedicated servers will fall from an average of $11,000 in 1986 to $7,000 by 1991.

Several forces are driving the increasing use of dedicated servers. Technological advances, including the advent of Intel Corp.'s 80386 microprocessor and new disk drive controllers, allow server makers to design more flexible, higher performance products. The 80386 gives server makers the chance to "leapfrog" current server technology, said Mark Calkins, director of corporate marketing and development for Provo, Utah-based Novell.

Users are also shaping the evolution of servers. "As users demand more functionality from local network environments and move to tie local networks together or to access a public packet-switching network, the server is going to be the logical place to combine these functions," IDC's Gold said.

Servers with uninterruptible power supplies, as well as servers capable of automatically archiving data onto optical disks, are coming, according to Novell's Calkins. However, rather than combining more functions on a single server, Novell is looking to maintain the distributed nature of local networks by offering multiple servers.

"We take the approach that we'd rather have a communications server that integrates X.25, asynchronous and IBM [mainframe] communications with remote bridging in one box, but keep it separate from the file server," Calkins said. He said he anticipates file serving will be separated from print serving as more users choose to secure servers behind locked doors, but look to maintain easy access to print servers.

Banyan Systems, Inc.'s vice-president of business development, Anand Jagannathan, said he believes the key issues of server technology are "being able to run software like a data base management system or communications software on the server, and that server functionality should be portable so a vendor can have a family of servers." Banyan's use of Unix, a relatively portable operating system, as the basis of its Virtual Networking System (VINES) gives the company an edge, Jagannathan said.

"Over time, we can integrate more and more Unix applications as part of our server," Jagannathan said. In addition, Banyan will be able to run VINES on commodity 80286-based personal computers, its own dedicated servers, and minicomputer-style machines, he added.

3Com's Bressler said he agrees with Jagannathan that users' desire to run applications on the network server is rewriting the script for how vendors choose an operating system to run on a server. "The ideal thing would be to provide in the server the operating system that best suits the application," Bressler said.

As a result, 3Com is considering supporting different operating systems — possibly one for the low end of the market and another on its dedicated server, Bressler said.

Unlike Banyan and Novell, 3Com's server does not have slots for add-on boards, so it cannot support multiple network interface cards or other communications cards.

Bressler noted 3Com favors implementing additional server functions in software. "People like to buy one server and be done with it, but people don't mind buying more software," he said.

Overall, users can look for more differentiation among server products in the next few years. Pricing at the low end of the market will continue to be extremely competitive. Dedicated servers will sport new, or newly integrated, functions. And vendors such as Digital Equipment Corp., IBM, Wang Laboratories, Inc., and even Tandem Computers, Inc. will increasingly promote minicomputer server solutions. ☑

INSTALINK460 DOV Mux lets you add terminals wherever you have telephones.

Our success is based on giving you the same old line.

Take advantage of your building's current phone lines to expand data traffic. INSTALINK460 data-over-voice local muxes let you plug into the future without installing anything.

Add terminals wherever you have single or multiple line phones. Just plug the terminal into your phone jack, your jack into INSTALINK, and the INSTALINK Controller into your main telephone switch.

Any other way to add terminals to your existing data network should be avoided at all costs. Because they all cost plenty. Now, MICOM's INSTALINK460 data-over-voice local mux lets you add an async terminal absolutely anywhere you currently have a telephone. And it's as simple as plugging your phone into an ordinary outlet.

The beauty is that you can go right on using your phones. Data service won't interfere with tone dialing or voice-grade modems. And voice service isn't affected by an interruption of data service.

So what happens if your company reorganizes or if a department equipped with INSTALINK moves? You simply unplug your INSTALINK network, carry it to where you want it, and plug it back in.

INSTALINK460 transmits at speeds up to 19.2 Kbps for distances as great as 22,000 feet per channel. And when you're ready to build a widely dispersed campus network, it interfaces with INSTATRUNK480, our high capacity local T1 mux.

Call our applications hotline. We have all the answers you need on INSTALINK. Or to any other thorny datacomm problem that's bugging you.

INSTALINK460. A datacomm product you'll only be interested in if your company has telephones.

Cable can turn into an ugly snake that will bite you in the future. INSTALINK helps you avoid the horrors of costly, inflexible pre-wiring.

MICOM Systems, Inc., 4100 Los Angeles Avenue,
Simi Valley, CA. 93063-3397 Europe: UK-(44)
(635) 832441. Int'l: USA-(01)(805) 583-8600.
"MICOM," "INSTATRUNK480" and
"INSTALINK460"*

1-800-MICOM-US

DATACOMM BY
MICOM

More ways to help computers do more.

COMMUNICATIONS MANAGER

> “The corporate telecommunications infrastructure is a business asset whose quality and availability will have more than a peripheral impact on any Fortune 500 company's economic health. The firms that did not recognize this by the early 1980s will have to move fast to avoid being preempted.
>
> **Peter Keen**
> From *Competing In Time*
> Ballinger Publishing Co.

▶ *SHARED TENANT SERVICES*

STS alliance widens scope

Focus shifts to promoting STS.

BY BOB HAMEL
Senior Editor

WASHINGTON, D.C. — Having spent its first three years fighting state-imposed restrictions on shared tenant services (STS), the Multi Tenant Telecommunications Association (MTTA) is now concentrating on increasing membership and educating users that the concept of STS is still alive and well.

MTTA, formed in 1983 and based here, is a trade association that represents the interests of 60 major players in the STS field. Members include real estate developers, STS providers, telecommunications equipment manufacturers and even one of the Bell operating companies. The group's goals are to promote the common interests of STS providers and to act as a clearinghouse for STS information.

The concept of STS calls for a provider, often the owner of the office building, to offer tenants communications equipment and services they can use on a shared basis.

According to John Daly, executive director of MTTA, “Very few major companies in shared tenant operations are not involved in MTTA.” The membership reads like a who's who in real estate development and STS providers, including Amerisystems, Inc. (formerly part of the Lincoln Property Corp.), Electronic Office Centers of America, Inc., Rockefeller Center Properties, Inc., Bramtel, Inc., the Prudential Realty Group, Fairchild Industries, Inc., Johnson Controls, Inc., BellSouth Technologies and Northern Telecom, Inc.

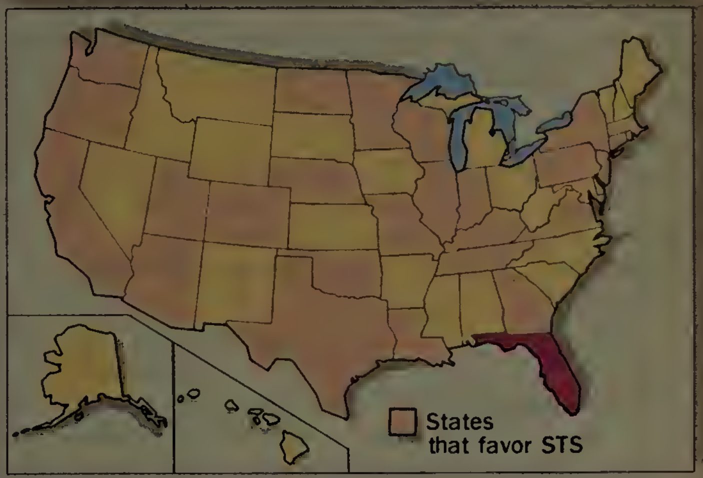
During the past three

See **STS** page 18

Florida fights for shared tenant services (STS)

Requirements in Florida for STS

- Certification and filing of tariffs
- 250-trunk cap on STS PBX using shared or pooled exchange services
- PBX switch partitioning
- STS rate structure of 60% of prevailing trunk rate plus 12 cents per message
- Direct Inward Dial trunk rate at 60% of prevailing rate plus a $40 surcharge
- Multiple building service subject to 250-pooled-trunk limit



SOURCE: “MULTIPLE TENANT TELECOMMUNICATIONS ASSOCIATION REPORT,” WASHINGTON, D.C.

GUIDELINES

BOB HAMEL

The magic black box that saves money

A telecommunications manager once brought a black box in to the office, set it down in front of the workers and announced, “This is a call-accounting system. It will make a record of every telephone call made from this office.” Abuse of the telephone system came to a halt, even though the “call-accounting system” was nothing more than an empty box.

Controlling communications costs is one of the most important facets of a communications manager's job, and the apocryphal tale related above shows that a call-accounting system — real or otherwise — can be a valuable tool in cost-containment efforts.

By collecting and pricing call record data, monitoring circuit and trunk usage, and breaking down usage and costs by trunk groups, departments and users, a call-accounting system gives the manager some hard facts on who is using what, when and how often.

Call-accounting systems do more than help a telecommunications manager track his company's telephone use and curtail abuses. These add-on systems are also proving invaluable to many users in recovering telephone system costs.

James Meehan, a principal of Meehan, Boyle and Cohan, a Boston law firm, said the firm bought an Opus, Inc. call-accounting system to track long-distance calls made for clients. Meehan said the system is saving the company about $2,000 a month by helping him bill clients more accurately for telephone costs — a process known as recapture. “Now, we have a recapture rate of about 87.4% on our long-distance costs,” Meehan said. By billing clients in this way, Meehan said the Opus system will pay for itself in six months.

David Baldwin, an administrator for Snyder, Tepper and Comen, another Boston-based law firm, said the call-accounting system his firm purchased is recapturing long-distance call costs at an 88% clip, which is a vast improvement over the previous manual tallying method.

“Previously, we were tracking telephone calls by hand, and were matching about 25% of the monthly long-distance

See **Box** page 18

▶ *INFORMATION TECHNOLOGIES*

MCI puts up $10 million for research center

BY BOB HAMEL
Senior Editor

WASHINGTON D.C. — MCI Communications Corp. recently created the International Center for Information Technologies (ICIT), a $10 million effort designed to help businesses, government units and universities take advantage of advanced telecommunications and computer technologies.

The 6-month-old research center is headed by Executive Director Peter Keen, an authority on office communications and telecommunications. Keen has gathered a core of researchers, planners and educators to prepare workshops, conferences, publications, educational programs, and advisory and consulting services for the center.

“The information field is no longer confined to telecommunications and computers,” said Tom Lauria, ICIT's communications manager. “Optical storage, CD-ROM, advanced workstations, VSATs, smart cards, information delivery in voice, video, text and data are all part of information technologies,” he said. “ICIT will try to get a handle on these emerging technologies for corporate and educational audiences.”

MCI is placing the responsibility for success of the subsidiary squarely on the shoulders of Keen,

See **Information** page 18

PEOPLE

James D. Edwards has assumed the responsibilities of president and chief executive officer of TelWatch, Inc., a Boulder, Colo.-based manufacturer of voice/data communications equipment and facilities management systems. A longtime employee of AT&T, Edwards served there as president of the Computer Systems Division and as vice-president for strategic business and market planning with AT&T Technologies, Inc.

TelWatch was formed by the December 1986 merger of OneCom, Inc. and TelAccount. The privately held company is venture-capital-financed by Salomon Brothers Venture Capital of New York and the Hill, Kirby & Washing Partnership of Boulder, Colo.

* * *

Daniel L. Presser has stepped down from the post of president and chief executive officer of Chipcom Corp., a Waltham, Mass.-based manufacturer of modem

See **People** page 18

Information from **page 17**

author of *Competing In Time, How to Use Telecommunications for Competitive Advantage.*

MCI will not be involved with day-to-day ICIT activities but has committed to funding the center for three years.

"Within three years, we hope the advisory work and custom research projects for companies whose requests fit into the ICIT research agenda will make us self-supportive," Lauria said.

"We see ourselves as a clearinghouse for information, a funder and sponsor of research programs and awards, and soon, a publisher of research," the communications manager said.

Lauria describes ICIT as a place to share ideas, amplify the work of other research organizations and contribute original research when possible.

Lauria said the center has plans to investigate the impact of information technology on the airline and transportation industries, as well as financial and banking services, insurance, medical aid and biological research.

Although ICIT has not produced any seminars or conferences yet, it will sponsor six summer internships for master's and doctoral degree candidates studying in the fields of management of information systems, information technologies and related business or computer sciences.

In addition, the center is offering five $10,000 awards for doctoral dissertations in these fields.

Lauria said the educational programs division is in the process of developing video programs on telecommunications.

It also intends to hold study panels on issues such as the senior management role in planning for information technology, methods of measuring business value from information technology and the information system organization of the future.

The center is preparing management briefing papers in areas such as Integrated Services Digital Network, videoconferencing, computer fluency, defining integrated systems and the business opportunities of very small aperture terminals.

As part of its long-term planning, the center hopes to establish a series of videoconferences tying the research departments of key universities into a real-time, online dialogue.

The first ICIT-sponsored conference is slated for June 24 and 25 here and is entitled "Taking Charge of Change."

The center plans to invite representatives from academia and the business world to discuss how research can contribute to the survival of business in the 1990s.

"We intend to do a pre-event polling of attendees, asking what issues they see as critical and what they would like open to discussion," Lauria said.

Box from **page 17**

bill to our clients," Baldwin said. By having the firm's staff enter a client account code when dialing a call, every long-distance call is tracked.

"Ten months after being installed, the system will have paid for itself in additional revenue," Baldwin said.

Vendors of call-accounting systems are reporting that the products are practically selling themselves. As reported in the North American Telecommunications Association "Market Update" report, Duane Morphew, manager of sales engineering for Norstan Communications Systems, said the company is selling call-accounting systems with over 80% of its new private branch exchanges.

Ergotec, a research and consulting firm based in New Jersey, estimates that unit sales of call-accounting systems are growing an average of 25% a year and that the dollar value of sales of call-accounting systems is rising by 35% annually.

That's not surprising, considering that cost-containment is a watchword at most U.S. corporations. Call-accounting systems, when used properly, can really help a communications manager get a better grip on telephone expenditures.

People from **page 17**

products for broadband cable networks. Citing a desire to pursue other opportunities, Presser leaves after serving for over two years. His duties will be assumed by Yoseph Linde, the company founder.

* * *

Paul H. Till has assumed the presidency of Market Information, Inc., an Omaha, Neb.-based subsidiary of United Telecommunications, Inc. Market Information transmits financial information and commodity quotations and provides data networking services.

For the past seven years, Till has served as chairman of the board of Market Information and as a vice-president of United Telecommunications.

Electric Courier Systems, Inc. of Eatontown, N.J., has chosen Roy B. Anderson Jr. to assume the positions of executive vice-president and chief operating officer. Anderson is a former vice-president of marketing for Western Union's Telex and EasyLink products. He will now oversee day-to-day operations in addition to the company's marketing of its Xpedite product.

* * *

American Photonics, Inc., a manufacturer of fiber-optic data communications products based in Brookfield Center, Conn., appointed Angelo J. Ianello as vice-president and chief financial officer. Ianello had served as a vice-president and chief financial officer for Everest Legal Systems, Inc.

STS from **page 17**

years, MTTA has spent much of its time working behind the scenes to change regulations that restricted STS in Texas, Florida, California, Oklahoma and Kentucky.

Now the group is shifting its focus and will be promoting itself and the concept of STS. "We need to get the message out that STS is alive and well," said Bernie Bishop, president of MTTA.

Bishop said that after deregulation, STS promoters told developers they could make big profits by providing communications services to tenants. The rush to enter the potentially lucrative new market was irresistible, he said. "A lot of people entered the STS market for the wrong reasons, often without the right qualifications or sufficient financial backing," Bishop said. As a result, STS generated a lot of bad press, which MTTA has been working to offset.

Bishop said the group is publicizing successful STS operations and applications that operators and tenants have jointly developed. "We need to educate the industry on the productivity gain opportunities and cost savings that STS represents, particularly to the small and medium-sized tenant," Bishop added.

Terry Place, president and chief executive officer of another STS provider, Amerisystems, concurred with Bishop. "A lot of MTTA's efforts have been spent in the regulatory area, which will continue, but the immediate requirement of 1987 is to come out and make the regulators, developers, communications consultants and the communications managers more aware of the virtues of shared tenant services," he said.

Jack Gavigan, director of telecommunications for the Prudential Realty Group, is a member of the MTTA board of directors. "I hope the association gets stronger and takes a more active role in marketing shared tenant services," Gavigan said. "That is what the organization should and could be doing."

Another board member, Tom Osborn, an executive vice-president with STS provider BramTel, said the dual goals of redefining real estate developers' expectations about STS and encouraging partnership between STS providers and developers are important issues facing the MTTA. "The whole process of shared tenant services has to be resold to the developers," Osborn said. "In the beginning, the developers got a real snow job. They were told they could make as much on telephone service as on the property itself, which just isn't true," Osborn said. "We need to approach STS as a profitable amenity."

> "We need to educate the industry on the productivity gain and cost savings that STS represents."

According to Daly, MTTA formed a "strategic alliance" with the Intelligent Buildings Institute (IBI), a Washington, D.C.-based association concerned with issues relating to computer controlled office environments.

"The MTTA and the IBI have reached agreement to support each other in developing the concept of intelligent buildings, and the research, marketing and promotion of the shared tenant services concept," Daly stated. "MTTA is a telecommunications-oriented organization that provides the communications pathways the intelligent building needs to function. The cooperation is a natural merger of the two groups."

In addition, Daly said MTTA has a pending agreement to share information and conduct seminars with the American Institute of Plant Engineers, whose members often are the facilities managers in office properties. Also, the group is conducting talks with the Facilities Managers Association and the Building Owners Management Association for the same purpose.

Daly indicated that the MTTA is working through Bell South Technologies, a representative on the MTTA board of directors, to develop similar information-sharing relationships with other BOCs.

Daly considers education the toughest issue facing the group. "We've got to get across the concept of STS and its advantages. Educating the public is our prime concern." The group is looking to hire a coordinator to oversee a slate of seminars it will conduct this year.

Joe Baker, the director of marketing programs for Northern Telecom, Inc. and a member of the MTTA, feels that participation in the association helps the equipment manufacturers understand the needs of end-user tenants. "It's through groups like the MTTA that we can get the input to allow us to develop products that are useful," Baker said. "The biggest beef from a customer is that the big companies don't solicit their input."

With the glut of available office space in most major U.S. cities, many developers are using STS amenities as a lure to latch onto tenants. Bishop's company, the Electronic Office Centers of America, for example, is spending $3 million to retrofit the Greenway Plaza in depressed Houston, Texas. The STS retrofit includes installation of equipment and cabling to interconnect all buildings in the 4.5 million-square-ft complex.

Daly is even thankful for the bad press that STS has gotten in the past few years. "The hype did us a favor. It helped us shake out those people who didn't belong in shared tenant services in the first place."

NEW PRODUCTS AND SERVICES

See inside for:
▶Modem net monitor package
▶Macintosh-to-IBM gateway
▶PC-to-facsimile package

▶ *INTERFACE '87*

Dynatech, Data Switch enhance product lines

Dynatech switch controls IBM mainframe channels.

BY JIM BROWN
New Products Editor

SPRINGFIELD, Va. — Dynatech Data Systems recently introduced the Channel Management System (CMS), an IBM plug-compatible channel matrix switch that lets users switch peripherals between mainframe channels.

The firm also introduced a new model of its high-end matrix switch that doubles the port capacity of the existing model and will support a fiber-optic connection that allows port banks to be located up to 1,000 ft from the matrix switch.

The CMS is reportedly a repackaged version of a similar product that has been available in Europe for the past year. It operates on the channel side of peripheral controllers, allowing front-end processors as well as disk, tape, printer and terminal controllers to connect through the switch to different channels on one mainframe or to different mainframes.

The switch operates at channel speeds of 24M bit/sec. It can be used to provide alternative routes into a mainframe for front-end processors or controllers, and it allows several mainframes to share the same peripherals. According to Dynatech, the CMS will also allow more than eight controllers to connect to a

See **Dynatech** page 20

Data Switch Galaxy Plus integrates T-Bar line.

BY JIM BROWN
New Products Editor

SHELTON, Conn. — Following its merger with T-Bar, Inc., Data Switch Corp. has integrated its IntelliNet performance measurement system with T-Bar's Galaxy data switch in a product dubbed Galaxy Plus.

Data Switch also announced that it has enhanced its IBM Personal Computer AT-based MasterNet 300 data switch network control system. MasterNet 300 now can be used to control T-Bar's Galaxy and Monolith DSM communications switches as well as T-Bar's Model 3232 peripheral switch.

Running under the Xenix operating system, MasterNet 300 also controls Data Switch's Model 1200 and Model 1400 peripheral switches, Model 1488 host-to-host communications switch, XY-MAX Model 2860 and IntelliNet performance monitoring system.

The Galaxy Plus offering includes a Galaxy switch that supports 2,048 ports and a variety of interfaces, including RS-232/V.24, V.35, RS-366-S, X.21 digital and four-wire analog. The switch's support for a 56K bit/sec V.35 digital data transmission line reportedly does not reduce the number of RS-232 ports it supports.

One of Galaxy Plus' standard features allows

See **Data Switch** page 21

▶ *NETWORK SYSTEMS CORP.*

Device links 3270, asynch tubes

BY JIM BROWN
New Products Editor

MINNEAPOLIS — Network Systems Corp. recently introduced a switch that allows IBM 3270 terminals and asynchronous terminals to switch connections between multiple hosts.

The firm's 3270 MultiSwitch is targeted at sites where terminal users need to access data on multiple IBM or asynchronous hosts. It supports IBM 3178, 3179, 3278 and 3279 terminals as well as asynchronous terminals. The unit will reportedly support nearly all 3270 emulation boards, allowing personal computers emulating a 3270 terminal to use the switch.

Supporting up to 96 connections, the 3270 MultiSwitch sits between the terminal and the terminal controller or asynchronous host. Supporting both 3270 and asynchronous traffic, it will route connection requests and data from the terminal to the appropriate terminal controller or asynchronous host port. The firm says the 3270 MultiSwitch will allow 60 terminals to connect to a 30-port terminal controller as long as active connections do not exceed 30.

The firm says the device will also translate data in IBM's 3270 EBCDIC format to ASCII format so that 3270 terminals can access asynchronous hosts from such vendors as Digital Equipment Corp.

The unit is said to be compatible with existing wiring schemes, such as coaxial cable and twisted pair. The company also said coaxial or fiber-optic cable can be used to link multiple 3270 MultiSwitches into a network.

The 3270 MultiSwitch cabinet houses eight Interface Units, four of which must be 3270 Interface Units. The remaining four Interface Units can support any mix of asynchronous Interface Units, minicomputer Interface Units or fiber-optic repeater units used to connect multiple 3270 MultiSwitches in a network.

Priced at $32,700, the 3270 MultiSwitch is available from Network Systems, 7600 Boone Ave. North, Minneapolis, Minn. 55428 (612) 424-4888.

Products & Services

Board accesses DDS lines from Micom Box

Micom Systems, Inc. announced a board that supports access to AT&T Dataphone Digital Service (DDS) lines from the Micom Box, the firm's multifunctional communications unit. The **MB-D56-1** integrated service unit allows users to transmit data over a 56K bit/sec DDS line.

The board combines the functions of the data service unit and the channel service unit needed to connect to public digital networks. It supports test-pattern generation and diagnostic tests. The MB-D56-1 is software-configured when used with the Micom Box Type 3 concentrator. It is hardware-configured when used with Micom Box Type 4 and Type T multiplexers.

The MB-D56-1 is priced at $1,250.

Micom Systems, Inc., 4100 Los Angeles Ave., Simi Valley, Calif. 93063 (805) 583-8600.

Package links remote data to PC DBMS applications

FastCOMM Systems, Inc. released communications software that links personal computer data base management packages to data residing on other remote systems.

Dubbed dCOMM->LINK, the package runs on IBM Personal Computers with DOS 3.0 or higher, 640K bytes of random-access memory and an RS-232-C serial port. The package reportedly enhances the capabilities of Ashton-Tate's dBASE III Plus, Quicksilver Software, Inc.'s Quicksilver, Fox Software, Inc.'s Foxbase Plus and Nantucket, Inc.'s Clipper by linking data collected from such devices as bar code readers and point-of-sale terminals directly into data base management applications over RS-232-C connections.

Residing in memory, dCOMM->LINK reportedly converts incoming data formats to the format of the data base management application. It then directly loads that data into the application, thus bypassing the Personal Computer operating system. The firm recommends the use of a hard disk and a Hayes Microcomputer Products, Inc.-compatible modem and says the package cannot be used concurrently with other memory-resident programs.

The product is available immediately and is priced at $295.

FastCOMM Systems, Inc., 235 Carrol Canal, Venice, Calif. 90291 (213) 306-8592.

V.32 modem enhances echo cancellation

Universal Data Systems, Inc. (UDS) unveiled a V.32 full-duplex digital modem

See **V.32** page 20

NCR COMTEN

IBM 3270s access X.25 nets

Software hastens CPU switching, too.

BY JIM BROWN
New Products Editor

MINNEAPOLIS — NCR Comten, Inc. recently announced a software module that enables its communications processor-resident Extended Connectivity/3270 (XC/3270) package to allow 3270-type terminals to access X.25 packet-switched networks. The module also simplifies the switching of connections between applications on the same or different mainframes.

Residing on NCR Comten's 3690, 3695, 5620 or 5660 Communications Processors, the Display System Manager (DSM) adds X.25 network access, quick switching capability and access point security to the firm's XC/3270 package. XC/3270 links 3270 devices to multiple Binary Synchronous Communications and IBM Synchronous Communications networks.

The DSM package also includes a terminal packet assembler/disassembler that allows 3270 terminals to access X.25 networks that support the Telenet Communications Corp. Display System Protocol.

To access DSM, 3270-type terminal users — including users of IBM Personal Computers and asynchronous terminals that emulate 3270 terminals — enter the correct password. DSM's access-point security feature then displays a menu of network devices that the terminal user is allowed to log onto. The user then logs onto all the necessary applications, making sure to provide the correct password to enter the application.

DSM remembers those connections and allows users to switch between them with a few keystrokes. The routing, logon and logoff procedures for each application are maintained in the communications processor's memory by DSM.

DSM is layered on top of Comten's Advanced Communications Function/Network Control Program, Comten Communications Access Method and Comten X.25 Interface software. DSM also requires the use of Comten's Network Support Services and Comten Language Support System packages.

The company said DSM's virtual terminal addressing feature allows network operators to change network configurations while the network remains on-line.

The monthly license fee for DSM ranges from $150 to $450, while the yearly license fee ranges from $1,650 to $4,950.

NCR Comten is located at 2700 Snelling Ave. N., St. Paul, Minn. 55113 (612) 638-8400.

Products & Services

V.32 from **page 19**

that speeds up echo cancellation in dial-up environments.

The **Universal V.32 Dial-Up** supports synchronous or asynchronous two-wire dial and leased-line transmissions at up to 9.6K bit/sec. It is CCITT V.32-compliant and features UDS' Adaptive Near/Far Echo Cancellation scheme.

This scheme compensates for line impairments and delays due to satellite hops and long-distance links by allowing the local modem receiver to cancel echos occurring as far away as the remote modem. It also has an automatic equalizer working in conjunction with the echo canceler to compensate for changes in line conditions.

Using trellis-coded modulation, the unit has a central control panel containing a 16-character LCD display. For asynchronous applications, the modem's integral auto call unit responds to either Hayes Microcomputer Products, Inc.'s AT or UDS' modem command sets and will store up to 10 telephone numbers in nonvolatile memory.

Other features include auto loop-back, auto switch-over and auto speed fall-back to 4.8K bit/sec.

The Universal V.32 Dial-Up is priced at $2,495.

Universal Data Systems, a division of Motorola, Inc.'s Information Systems Group, 5000 Bradford Drive, Huntsville, Ala. 35805 (205) 721-8000.

Modem network monitor package bows

Telcor Systems Corp. unveiled a personal computer-based package that allows host-site personnel to monitor and control modems in a dial-up data network.

Called the **Network Administrator,** the package runs on an IBM Personal Computer AT or compatible and supports modem control, status reporting, audit trail and security management.

The package allows network administrators to set modem option and security parameters for host-site and remote modems. It collects records of significant events on the dial network or in host-site modem banks and maintains a current-status display.

The audit trail records standard and unusual events, such as transmission start and stop times of each call and line usage information. Historical files are maintained in an Ashton-Tate dBase III data base so users can develop customized reports.

The security management capability controls host password access and can include host callback. If the remote units are Telcor modems, then local password access, automatic key management and data encryption can be employed.

The Network Administrator is priced at $895.

Telcor Systems Corp., 12 Michigan Drive, Natick, Mass. 01760 (617) 653-3995.

Case unveils 6-channel mux, Macintosh-to-IBM gateway

Case Communications, Inc. introduced a six-channel time division multiplexer and a gateway product that allows asynchronous devices such as Apple Computer, Inc.'s Apple II and Macintosh personal computers to access IBM host devices.

The **7126 Time Division Multiplexer** supports data and voice transmissions at 56K bit/sec over digital services such as AT&T's Dataphone Digital Service. The device can concentrate both digital and analog modems or serve as a backbone for other multiplexers. When used as a backbone, the device integrates asynchronous and synchronous applications on a single link. The unit also supports varying incoming speeds by buffering each incoming channel.

The device's voice channel supports a Continuously Variable Slope Delta modulation voice circuit operating at either 32K bit/sec or 16K bit/sec.

AMERICAN PHOTONICS

Ethernet LAN debuts

BY JIM BROWN
New Products Editor

BROOKFIELD CENTER, Conn. — American Photonics, Inc. recently released an Ethernet-based, star topology fiber-optic local network that supports up to 1,682 single or multiport Ethernet transceivers.

The firm's RL8000 Ethernet Active Star Distribution System star topology network is compatible with Ethernet Version 2.0 or IEEE 802.3 and supports both fiber-optic and coaxial cable. The heart of the device is the Central Active Star or hub unit, which supports communications among up to 30 other devices, including other star networks.

Remote Attachment Units (RAU) are used to convert electrical Ethernet transceiver signals to optical signals carried over fiber-optic cable that links to a fiber interface board in the Central Active Star.

Besides increasing Ethernet's 1,024 transceiver port limitation to 1,682, the RL8000 extends Ethernet's distance from 2,000 meters to 4,000 meters. It also provides built-in diagnostics, including segmentation, activity and collision indication.

The Central Active Star supports 11 boards, one of which must be a multifunction board that performs diagnostics and acts as an Ethernet repeater.

The Central Active Star costs $4,350. A fiber-optic interface board supplied with an RAU costs $1,200, and a wire interface board costs $1,000.

American Photonics is located at 71 Commerce Drive, Brookfield Center, Conn. 06805 (203) 775-8950.

Dynatech from **page 19**

channel as long as no more than eight are active.

The CMS supports two types of boards. One is a channel input board, which connects channels to the switch. The other is called a peripheral switchable interface, which connects peripheral controllers to the switch. As many as 64 channel inputs and 64 peripheral switchable interface outputs are supported by the unit.

The CMS internal software establishes and changes connections within the switch. According to Ray Mazurek, vice-president of marketing, an operator may determine which mainframe will connect to which peripheral through a touch-sensitive front panel. The front panel also includes a matrix array of LED displays that shows the CMS' configuration and indicates channel activity through the switched data paths.

Mazurek also said the CMS can be controlled from a Dynatech DynaNet 52 terminal. A typical system switching 16 peripheral controllers between eight channels costs $150,000.

The firm also released the 4,096-port 4040 model of its Configuration, Test and Monitor (CTM) switch, which doubles the port capacity of the CTM 2020. The CTM 4040 provides the same functionality as the CTM 2020 and switches connections between terminals, front-end processors and modems. The 4,096-port version of the CTM 4040 costs roughly $140,000.

The firm added an option to both the CTM 2020 and CTM 4040 that allows users to employ fiber-optic cable to link port banks to a switch located up to 1,000 ft away. Previously, port banks could be no more than 50 ft from the switch.

The Extended Port Bank Interconnect Capability Feature requires the use of a pair of fiber-optic multiplexers. The system that extends the 64 ports to the full 1,000 ft costs $13,700.

Dynatech Data Systems is located at 7644 Dynatech Court, Springfield, Va. 22153 (800) 368-2210, in Virginia (703) 569-9000.

Products & Services

The 7126 Time Division Multiplexer supports local and remote diagnostics and costs $1,700.

The **8110-A** gateway emulates an IBM 3274 cluster controller, providing protocol conversion for up to eight asynchronous devices linked to an IBM host using a Binary Synchronous Communications protocol. The unit will also buffer the host's higher speed file transfer and then transmit it at the asynchronous device's line speed.

The gateway provides a line tracing function for diagnosing problems in the connection lines, such as incorrect device address, poor RS-232-C connection and other potential problems associated with asynchronous to BSC connections.

It also provides an on-screen IBM terminal keyboard layout, allowing Apple II and Macintosh users to determine function and command key locations on their keyboards.

The 8110-A gateway costs $2,850.

Case Communications, Inc., 7200 Riverwood Drive, Columbia, Md. 21046 (301) 290-7710.

PC-to-facsimile packages released

Brooktrout Technology, Inc. introduced add-on boards and software that link IBM Personal Computers to facsimile machines.

The firm's **Fax-Mail** product line, which includes the Fax-Mail 96, Fax-Mail 48 and Fax-Mail 24, supports text and graphics transmission over standard telephone lines. This enables personal computer users to transmit documents from the device in which they were created. Fax-Mail-equipped personal computers can also receive transmissions from facsimile machines and store the files on disk.

Operating in background mode on the personal computer, the Fax-Mail offering can be configured to transmit and receive documents automatically. It supports an automatic dialing directory and will allow personal computers to store, edit and forward facsimile documents. The package will also support multiple-message and multiple-site document delivery.

The Fax-Mail 96, which costs $995, transmits at up to 9.6K bit/sec and is compatible with CCITT Group II and Group III facsimile machines. The Fax-Mail 48 transmits at up to 4.8K bit/sec, is Group III-compatible and is priced at $795. The Fax-Mail 25 transmits at up to 2,400 bit/sec, is Group III-compatible and is priced at $595.

Brooktrout Technology, Inc., 110 Cedar St., Wellesley Hills, Mass. 02181 (617) 235-3026.

Data Switch from **page 19**

satellite switches to be located up to 300 ft from the main switching cabinet.

Integrated with Galaxy Plus is a 16-line IntelliNet system that can be upgraded to support 512 lines. IntelliNet's line scan probes record performance data from incoming communications lines attached to the Galaxy switch and passes it to a Charles River Data Systems, Inc. microprocessor-based graphics display system.

Network performance measurements that exceed user-defined thresholds trigger a color-coded alarm on the IntelliNet screen. However, IntelliNet is then only able to take a limited number of predefined corrective actions, such as substituting a spare line for a failed one.

> MasterNet supports 1,000 predefined configurations.

IntelliNet has been upgraded to pass its performance measurement data to the MasterNet 300, which is able to entirely reconfigure up to 32 local or remote switches. MasterNet also receives interface performance data from the Galaxy switch.

MasterNet has been made compatible with the DSM PC, T-Bar's IBM Personal Computer XT-based system used to control Galaxy and Monolith switches. The DSM PC maintains a data base of the Galaxy switch or Monolith switch's configuration and can be operated remotely from the MasterNet 300.

Featuring both menu-driven and command-line software, MasterNet supports 1,000 predefined configurations that can be used to restore systems after a failure. It also supports remote operation of testing and monitoring devices attached to a switch's administration ports.

Very few customers have a need to deploy IntelliNet, MasterNet 300 and the DSM PC in their existing Data Switch and T-Bar switching networks, the company conceded. But, the capabilities were developed in an effort to assure T-Bar's installed base that the T-Bar product line would not be abandoned as a result of the merger with Data Switch.

A Galaxy Plus system supporting 1,280 ports and a 16-line IntelliNet system will sell for $448,000. The MasterNet 300 system starts at $30,600.

Data Switch also folded into its product line the T-Bar 9043 fiber-optic channel extender, which extends to more than a mile the distance that printer and terminal controllers can be located from an IBM host's byte multiplexer channel.

Data Switch is located at One Enterprise Drive, Shelton, Conn. 06484 (203) 926-1801.

*International Data Corporation**
announces a major Executive Conference —

Internetworking:

Successfully Managing the Multicarrier/Vendor Network

May 3-6, 1987 • Amelia Island Plantation, FL

Internetworking is the information professional's newest, most difficult challenge.
Network options are multiplying. Local networks . . . dial-up networks . . . data networks . . . private networks . . . packet networks . . . video networks . . . ISDN networks . . . no wonder internetworking is on all our minds.

IDC presents a concentrated course in managing the elements of tomorrow's integrated intra- and inter-company network.
During the three-day conference, representatives of the three leading alternatives in networking systems—IBM, DEC and AT&T—will host sessions, as will top product experts from Fortune 500 user firms. They will discuss ISDN, management perspectives on networking the enterprise, market trends, network strategic planning, new directions in equipment, financing systems, team networks, networking with suppliers and vendors, software and maintenance services, and much more. The faculty includes:

- **William Ahlstrom,** *Senior Vice President*, Avant-Garde Computing Inc.
- **Walter Bzdok,** *Senior Director*, Corporate Communications, K-mart
- **Doug DeCarlo,** *Publisher*, *Network World*
- **Dr. Howard Frank,** Howard Frank Associates
- **Haines B. Gaffner,** *President*, LINK Resources
- **Henry Giese,** *CEO*, Finalco Telemanagement
- **Aaron Goldberg,** *Vice President*, Microcomputer Services, IDC
- **Barry Grahm,** *Vice President*, MIS, DWG Corporation
- **Allen Lark,** *Manager*, Telecommunications Marketing Programs, IBM
- **Carl Ledbetter, Jr.,** *Vice President*, Engineering & Scientific Programs, Prime Computer
- **William R. Leitch,** *President*, CW/Conference Management Group
- **Audrey MacLean,** *Vice President*, Business Development, Network Equipment Technologies
- **Carl Masi,** *Chairman & Chief Executive Officer*, IDC
- **Dr. John McQuillan,** *President*, McQuillan Consulting
- **Kim Myhre,** *Vice President*, Communications Research Group, IDC
- **Dr. Alan Pearce,** *Editor*, *Telecom Insider*
- **Dr. T. Doane Perry, III,** *Senior Industry Consultant*, IDC
- **Gerald H. Peterson,** *Director*, Corporate Systems Development, Ford Motor Co.
- **Allan Reheart,** *Director*, Data Networking Strategy, AT&T
- **Gerald Thames,** *Vice President*, Information & Communications Systems, Martin Marietta
- **Michael C. Thurk,** *Manager*, Network & Communications Product Management, Digital Equipment Corporation
- **Daniel Young,** *Assistant Vice President*, Product Marketing, Timeplex
- **Marina Young,** *President*, Global Information Systems Strategy Group, IDC
- **William F. Zachmann,** *Vice President*, Corporate Research, IDC

Make your reservations now.
Plan now to join 400 of your peers from Fortune 500 firms and government at Amelia Island Plantation to learn how you can meet the challenge of internetworking. Just fill out the registration form below . . . or call Diane Martin at **1-800-343-4952.** In Massachusetts, call **617-872-8200.**

*In association with ***Network World***

☐ ***YES,*** please reserve ____ places at **Internetworking,** IDC's Spring Executive Conference, May 3-6 at Amelia Island Plantation (just 35 minutes from Jacksonville, Florida).

Name______________ Company______________
Title______________ Address______________
City______________ State__________ Zip__________
Phone______________

☐ Please bill me at the pre-registration rate of **$875** per person. P.O. #__________
☐ My check for $__________ is enclosed.

IDC
International Data Corporation

Your partner in the information age

Send your form to:
Diane Martin
IDC
5 Speen Street
Framingham, MA
01701

Opinions

ELECTRONIC DATA INTERCHANGE

JAMES G. HERMAN

Strategic offense initiative

Getting upper management to think seriously about communications is no easy task, but electronic data interchange (EDI) may change that.

EDI, the generally used buzzword for intercompany networking, alters basic business processes such as buying and selling. The emergence of EDI-based electronic intermediaries can even restructure an industry, changing the relative strengths of competitors and possibly eliminating existing brokers and middlemen. EDI is a business issue that can make senior management sit up and pay attention.

In many industries, such as the automobile industry, electronic connections to customers and suppliers are rapidly becoming mandatory. Firms that aren't positioned to implement EDI capabilities will soon be at a competitive disadvantage.

In other industries, such as the pharmaceutical distribution business, EDI has offered major rewards to pioneers willing to invest in its capabilities. Rather than wait to be told to develop an EDI strategy, communications managers should bring the business case for EDI to their firms' management.

The time is right for EDI. After 20 years of heavy investment in the automation of internal business processes, it's clear that there is also great potential for automating intercompany processes.

For example, by linking a company's accounting and inventory tracking systems to those of its suppliers, the communications manager can save money, lessen delays and improve accuracy. Allowing customers to enter orders directly on the company's computer systems can have the same effects and can create strong barriers to competitors.

Electronic links to air and rail carriers, as well as direct submission of data to government agencies such as the Customs Service, are other business applications being covered by EDI. Also, financial transactions, an early form of intercompany networking, are now being tied into the other newer forms of EDI.

EDI can certainly improve the efficiency of business transactions, but it also has more profound effects.

Through tighter coupling of key processes in different organizations, intercompany networking increases the velocity of business cycles by lowering inventories and reducing float. EDI is a necessary ingredient in just-in-time inventory systems.

Most significant, however, is EDI's potential impact on the competitive structure of an industry. Direct electronic links may cut out middlemen, potentially eliminating entire companies.

Although leaders in automating buyer/supplier relationships have shown that EDI can offer tremendous advantages, development of industrywide protocol standards and intercompany networks may offer buyers more choice and create unexpected challenges to entrenched vendors.

In some industries, EDI may ultimately result in electronic markets, thereby threatening some major institutions. Not everyone will see EDI as a blessing.

The growing awareness of EDI's importance is evidenced by increased vendor positioning to serve EDI markets. Although many early EDI users have used their own networks to interconnect their customers and suppliers, the public data network vendors see their value-added networks as the logical vehicles for much of the next wave of EDI applications.

Value-added nets can reduce the number of communication paths a company needs and help with the management of electronic links. These vendors could potentially offer additional services such as translation, storage of messages and even some forms of brokering.

It behooves communications managers to examine the impact of EDI on their organizations. Working with sales, manufacturing, accounting and shipping, they should identify the areas where automation offers the greatest advantages.

Communications managers need to track their industry's EDI standards and look for nonstandardized opportunities for innovation. The communications alternatives for implementing EDI should be evaluated in terms of costs, management and strategic potential. Managers should quantify the cost savings that will be achieved through efficiency gains. Security risks should be addressed head-on.

A good business case includes estimates for capital investment and operating expenses. Assembling case studies from other companies can strengthen the communications manager's case.

An analysis of the likely effect of increased intercompany automation on the industry's competitive structure will really get the attention of management. It's time for those in charge to realize that EDI means business.

Herman is director of the Telecommunications Consulting Group at BBN Communications Corp. in Cambridge, Mass.

VENDOR STRATEGIES

ALAN PEARCE

Don't underrate AT&T

AT&T's mistakes have been so numerous since divestiture that it's becoming fashionable to knock the company. But most analysts are ignoring AT&T's enormous strengths. AT&T is still the dominant force in the telecommunications and information industries, and it appears to have a 10-point strategy for industry dominance:

- AT&T is protecting its dominant position in long-haul services, the key to its future. Prior to divestiture, AT&T monopolized the three telecommunications industry markets: local exchange services, long-haul services and equipment. Now it dominates only long-haul services. It has no local services and is forced to compete in the dynamic and capricious equipment markets.

AT&T's long-haul strategy is creating problems for competitors MCI Communications Corp./Satellite Business Systems (MCI/SBS) and US Sprint Communications Co., which are all losing money and are desperately trying to remain competitive.

- AT&T is promoting its long-haul strategy by getting its tariffs approved by the Federal Communications Commission and the state Public Utility Commissions (PUC). AT&T has been highly successful in this regard, especially with its private-line or virtual private-line tariffs. These tariffs permit AT&T, if local access charges are too high, to bypass the local exchange company.
- Ma Bell is maintaining direct access to its major users. These big spenders on telecommunications services and equipment are essential to AT&T's future success.
- AT&T is developing more "gee-whiz" services and equipment offerings than all of its competitors combined. Examples include the Software Defined Network and a wide array of enhanced and information services.

The company is still a major force in the equipment segment of the industry, even though it has to share the market with major competitors such as Northern Telecom, Inc. and the Western European and Japanese manufacturers.

- AT&T is actively pursuing deregulation, both at the FCC and before the state PUCs. The company is a proponent of the FCC's proposed deregulation of packet and contract services. If AT&T gets its way in this docket, it will be well-positioned to go after the major telecommunications and information users.
- AT&T dictates the pricing strategies of its major competitors in both the services and equipment markets. Both MCI/SBS and US Sprint are not price leaders but are often forced to set their prices below cost in order to maintain their market share in the long-haul business.
- AT&T seeks to offer intralocal access and transport area telecommunications services only in dense-

Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.

Lay down your own law. Send *Network World* a column for its opinions pages. Manuscripts must be letter-quality, double-spaced and approximately 600 to 750 words in length. Disk and modem submissions are preferred.

Columns should be timely, controversial, literate and technically accurate.

Contact Steve Moore, features editor, *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700, ext. 584.

▶ TELETOONS — By Phil Frank

Before we begin your training on the new phone system, may I ask if you've ever flown carrier-based aircraft?
Phil Frank

ly populated areas, where it will be profitable. It is ignoring sparsely populated rural states, where intra-LATA revenue is insignificant.

- AT&T is attempting to keep the regulatory wraps on the Bell operating companies and the major independent telephone companies.

For example, the company is arguing that U.S. District Court Judge Harold Greene should enforce the Modified Final Judgment as originally devised and that the FCC should rigorously analyze all of the BOCs' tariff support data.

- The company is beginning to acquire companies such as Ford Aerospace & Communications Corp. AT&T's strategy is to enter new businesses while consolidating its grip on existing ones.
- AT&T has reduced its work force to cut costs. At divestiture, AT&T employed 370,000 people; today it has fewer than 300,000.

As a consequence of these strategies, AT&T is poised to dominate the future of the telecommunications and information industries. It can control most of its competition in four ways:

1. Because of its nationwide backbone network, AT&T enjoys significant economies of scale that allow it to underprice its competitors and maintain its 80% market share.
2. Collocation of major customers' equipment with AT&T's equipment and facilities enables AT&T to attract large corporations as well as financial and government institutions that need sophisticated internal communications networks.
3. AT&T's capability to bundle equipment and services is simply not available to AT&T's competitors. No competitor can offer the array of services and equipment offered by AT&T.
4. AT&T could share its facilities and equipment with major customers in order to reduce users' costs substantially. This would effectively preclude competitive bids and reduce competition.

AT&T remains the dominant force in the telecommunications and information industries in the U.S. This dominance is well-established and is being solidified by means of its business and regulatory strategies. ◻

PLANT PROTECTION

DONALD E. KIMBERLIN

Don't get zapped

The unleashing of communications technology has created more equipment requirements for managers to understand than ever before. One has only to scan the trade or popular press these days to see the result: telecommunications managers are making many of the same mistakes that data processing managers did before them.

One such problem centers on the shift from the more durable electromechanical technology many of us grew up with to the more capable but more fragile integrated circuits. Even 20 or 30 years of experience in the industry might not have provided a manager with the expertise suddenly needed to protect these electronics.

An amazing amount of premises-installed equipment, particularly electronic private branch exchanges and key systems, is suffering repeated and massive hardware failure from mysterious causes. These often turn out to be the result of electrical storms.

Ignorance isn't bliss

Managers who don't understand the nature of lightning protection are easy marks for suppliers of plug-in fixes, such as telephone-line protectors and power-line conditioners. While these have significant value, they are not, in themselves, adequate protection. Further, many well-made lightning protectors have been destroyed because the buyer didn't know he had to give the protector someplace to send the lightning.

Worse yet, in these cases, the customer premises equipment vendor that installed the equipment may simply present the communications manager with a bill for $50,000 or more to repair damaged equipment. The manager is told with an honest shrug of the shoulders, "We did all we could," and is advised to file an insurance claim for an "Act of God."

Insurance maneuvers

Such advice is bad on several counts. First, insurance companies will react as rapidly as possible to recoup their losses — probably on your renewal premium — and at a rate that will astonish you.

Also, insurance companies are beginning to employ forensic investigators who are skilled in pinpointing clear violations of national codes and suggesting well-documented measures to avoid or reduce the odds of lightning damage.

If an insurance investigation reveals that a supplier or consultant fails to take these prudent measures, the insurance company may reject the claim even after payment.

The reason these incidents happen is that neither managers nor installation staff understand how to implement lightning protection for integrated circuits. They are often amazed to learn that lightning doesn't even have to hit the user's premises to destroy thousands of dollars worth of hardware.

Many are also surprised to learn just how much of the U.S. is at lightning risk — all but a small strip on the Southern California coast, according to long-standing statistics of the Rural Electrification Administration. And locations such as Athens, Ga., and Santa Fe, N.M., are at just as much risk as Orlando, Fla., even though they may have only half as many storms.

Grounding equipment to a water pipe or the power company ground stake isn't enough. These are usually in the wrong place to protect against lightning.

Failure to understand matters as important as lightning protection costs users significant wasted time during outages and large unrecoverable sums of capital to replace destroyed equipment.

Learn now, save later

Before the next storm season begins, managers and consultants should learn how to apply and specify safety codes and practices for basic lightning protective grounding.

Similarly, suppliers should bone up on their responsibilities and educate their staffs. It is also prudent to inspect and review all existing installations to correct any deficiencies.

By ignoring these actions, users merely set themselves up for catastrophes that could just as easily be avoided. ◻

Kimberlin is principal consultant of Mordon Services, a communications consulting firm in Safety Harbor, Fla. He also serves as a forensic consultant to insurance companies.

NETWORK WORLD

Features
April 13, 1987

▶ *MANAGEMENT PROFILE*

The great integrator

SRI International's Tony Holland has combined voice and data duties in one department.

BY MARY PETROSKY
West Coast Correspondent

Tony Holland admits he doesn't sleep much. Since taking charge of both voice and data communications for SRI International, Holland has concentrated his efforts on integrating the two groups' staffs.

Despite his lack of experience in voice communications, Holland was named manager of communications and technical services in 1983. His eagerness to learn and his adaptability, Holland believes, influenced upper management's decision to entrust him with the task of integrating voice communications with the data communications department he already managed.

"I was just brought into the office one day and advised that I was the manager of telecommunications as well as the other areas," the 35-year old Holland recounts. Overnight, his staff of 17 nearly doubled.

From his initial task of supporting 300 data lines, Holland is now responsible for both voice and data communications, including cable plant, private branch exchanges, local-area networks and equipment ranging from per-

☞ See **Integrator** page 26

PHOTO © 1987 BOB FOOTHORAP/BLACK STAR

Integrator from **page 24**

sonal computers to laboratory devices, at SRI's Menlo Park, Calif., headquarters. He oversees the care and feeding of a data network that includes five data PBXs with 2,800 terminations, 70 host computers and a mix of smaller systems, terminals and personal computers. Holland also manages a 150-node, campuswide Ethernet network.

Approximately 2,500 of SRI's 2,800 employees work at its headquarters, which sprawls across 70 acres and includes 20 buildings. Holland and his staff of 29 also maintain consulting relationships with SRI's regional offices.

SRI was founded by Stanford University in 1946 with the goal of fostering scientific research. The institute separated from the university in 1977 and today does research and development in the areas of science, engineering, management research and consulting. SRI estimates that its 1986 revenue was in excess of $200 million.

A quick start

Holland joined SRI in 1980 as a data communications specialist and initially had a staff of four. Soon he began managing technical services, which include servicing laboratory and office equipment, and became responsible for the acquisition, distribution and maintenance of microcomputers, terminals, printers and modems.

In 1980, telecommunications came under the purview of the director of information systems, Holland's boss. Prior to that, the telecommunications department had reported to security. The group's responsibilities included all telephone and message services, such as Telex, TWX and facsimile.

Once appointed manager of communications, Holland's directive was to integrate voice and data services.

"SRI saw the need for a closer alignment of those services due to future technological changes, specifically the [expected emergence of] voice and data PBXs," Holland says.

How to accomplish the integration was left up to him. "I had a strategic plan that I used as my basic charter," Holland says. "During the next several years I analyzed the situations I had and, as the opportunity came up, I started integrating services."

Merger diplomacy

Holland met informally with his staff to explain what changes would be made and what new tools he wanted to use. To allay people's fears, he says he emphasized "how these changes would make their jobs better by providing them with a broader range of skills."

Inevitably, he met resistance. Even before he became the acting manager of the newly combined group, three staff members left: one retired and two more went on to other jobs. "I want to make it clear; a lot of this can't be done without some pain," Holland says.

A key to creating a cohesive group in the long run is to recognize people's fear of change and to work with it, Holland says. "You have to respect people that are unwilling to change. You're not going to be perceived as a very good manager if you go in with a hard line or start moving people out because they're initially unwilling to make the change. What you're dealing with is the adaptability of your people."

Holland encountered the most resistance from supervisors. Their key concern was that their job duties were changing; not only was there a shift in the services they would be providing, but some supervisors' staff members were reassigned. Holland's strategy in gaining their cooperation was to focus on the goals of SRI as an organization.

First steps taken

After the initial turnover, no other staff members left, and Holland got down to the job at hand. Previously, as a data communications specialist, he had combined voice and data communications over one cable plant. In his new position, he decided to focus his initial efforts on the person users first encounter: the coordinators who take orders for telephone and data services.

"People want terminals, telephones and connections to mainframe computers on their desk," Holland says. "We had two separate groups taking requests and answering questions about telecommunications and data communications services. My first step was to integrate those two groups." He did that by moving them both under the same supervisor in a newly formed operations group. This group is responsible for taking requests from users, dispatching those requests and handling billing information.

A key to creating a cohesive group in the long run is to recognize people's fear of change and to work with it, Holland says.

Between 1983 and 1985, the operations supervisor worked on cross-training coordinators. Although staff members are still proficient in a specific voice or data area, each coordinator can handle basic-level requests. Holland also designed a single form for coordinators that replaced the two separate forms.

In addition, Holland moved the group from a manual record-keeping system to a computer-based system. Service requests are now entered into a central data base, and technicians work from the data base to handle requests. Last year, Holland integrated billing into this process.

"What I've actually done is eliminate a lot of the drudgery," Holland says. In the process, he streamlined the coordinators' jobs so that today three coordinators handle more work than was previously handled by five. "Originally, we were bringing in secretaries and administrative aides and training them to the level they're at today. Now that we're down to three people, we need to look for higher level people."

In the long term, Holland doesn't see himself simply as a telecommunications manager. "I see myself as a communications manager with an emphasis on information systems."

The group previously used an application running on a mainframe. In the last three years, Holland has been moving his group to personal computers linked by a local-area network. Holland says the micro-based system gives him more control. And because he is writing most of the applications for the group himself in the evenings and on weekends, the microcomputer environment makes developing applications easier.

Holland was structuring the organization so that technical and nontechnical services were separate. The next step was to combine the installation staffs. The new group is responsible for network services, installation, repair and design.

Two groups remained essentially unchanged: the technical services group that had previously been under his domain and the telecommunications operations group. The technical services group is still responsible for laboratory equipment, terminals, personal computers and modems. Telecommunications operations has been left intact because "in no way can I integrate our console attendant and message services, because there is no relationship to the services being provided elsewhere," Holland says.

Finishing touches

There is one more step left: "to come up with a singular billing system that lets us bill a similar amount, whether it's a voice or data request," Holland says. The way to accomplish that, he believes, is to integrate the data and voice technicians.

So far, Holland's lead telecommunications technician has given the data technicians a seminar on outside plant and termination types. "The plan is to continue that by sending our data technicians to school for telecommunications and vice versa," Holland says. The next step is to teach the voice people about computers, he says.

"A lot of telecommunications-oriented people have not been adapting to data communications. The reason is that you're not adapting to data communications, you're adapting to computers — what they are, what they can do for you and what they can do *to* you," Holland says.

Holland expects the integration of the technicians to be completed by mid-1988. "At that time, we would expect that a request from a user would include voice and data needs, and that a single technician would take that request through completion."

Self promotion

As a manager who emphasizes developing his staff's skills, Holland has also mapped out a strategy for improving his own skills and advancing his career. Holland's interest in electronics was sparked in high school. Subsequently, he went on to a technical school and earned an associate's degree in specialized technology and electronics.

After graduation, Holland was hired by Digital Equipment Corp. He was a field engineer by the time he left DEC to go to Tymshare Co. as a support engineer. He often called on SRI, which led to his current position.

As if managing a staff of 29 isn't enough to keep him busy, Holland is halfway through Golden Gate University's curriculum for a bachelor's degree in telecommunications management. His wife and two small children are a priority, but Holland admits that his limited free time is also split between writing programs for his staff and studying. He expects to complete the degree program in two years. Beyond that, he hopes to go on for a master's degree in business administration.

"I don't see anyone in a position like mine or any growth position not having an in-depth understanding of how business works or how you, as a service organization, relate to that business," Holland says.

In the long term, Holland doesn't see himself simply as a telecommunications manager. "I see myself as a communications manager with an emphasis on information systems," Holland says. "The questions in information systems are 'How do you take the information you have and make the best judgments you can, and how do you provide information to the people that need it?' That's what I look at providing."

With such a goal, it doesn't look like Holland will be getting much sleep any time soon.

Service Focus: Bulk calling services

Buying in bulk

BY BOB WALLACE
Senior Editor

Once the toast of the telecommunications industry, banded WATS has now taken second billing to more flexible, virtually banded bulk calling offerings.

Communications managers have already begun exploiting dedicated access to WATS by linking their facilities to the appropriate central office via transmission facilities that operate at 1.544M bit/sec.

Unlike their predecessors, virtually banded WATS and other such structured calling services portend eliminating telecommunications managers' need to reoptimize their voice networks for cost, as they now do one or more times each year.

Virtually banded services, such as AT&T's Megacom, MCI Communications Corp.'s Prism offerings and US Sprint Communications Co.'s Advanced WATS services, enable an individual user to place calls to any location in the nation without having to dedicate a line or lines to a particular geographic region or band.

Banded services require the telecommunications manager to use individual trunk lines for specific bands. Bands can be thought of as a series of concentric circles around the user location, with Band 1 being the closest circle and Band 5 the farthest away.

A user with a Band 1 WATS line can complete calls to sites located within that circle. To complete telephone calls to locations outside Band 1, the user must secure lines dedicated to additional bands. If the user purchases a Band 5 access line, he can complete calls to Bands 1, 2, 3, 4 and 5.

Use of any virtually banded service enables the user to complete a call to any location, regardless of where it is. A banded service's billing structure is based on the type of line used to complete the call. Under a virtually banded service, the user is billed by the distance of the call completed.

Dave Durgee, vice-president of development for The Aries Group, Inc., a Rockville, Md.-based tariff analyzing concern, explains that calls placed using banded bulk calling services are more restrictive than their virtually banded counterparts. If a Band 5 line is used to carry a call to a Band 1 location, the user is billed the Band 5 rate, which is more expensive than the Band 1 rate, he says.

To match calls to the least expensive facilities required to complete them, users can alter the private branch exchange's Automatic Route Selection (ARS) table. Durgee claims the PBX's ARS program would first attempt to place all calls over a Band 1 line, and if unsuccessful, would seize subsequent band lines for these calls.

Weary of reoptimizing your voice network? Sign up for a virtually banded transmission service.

"If a user has a banded service, the PBX has to handle any specialized call routing by band," Durgee states. "With a virtually banded service, the service takes care of this problem for the user."

Other network design specialists maintain that the biggest benefit of using a virtually banded service is the elimination of the communications manager's need to reoptimize the voice network for cost each time the company's calling traffic patterns shift.

Jerry Harder, a senior consultant with the Nashville-based Telco Research, a tariff analyzing and network design firm, states virtually banded services ease communications managers' network redesign fears. "Users experience changes in the volume of traffic and the pattern of this network traffic with some regularity," he says.

"If the company is using a banded service, there is a certain premium placed on the need to reoptimize their use of the service periodically," Harder explains. "If the user switches to a virtually banded offering, the need to reoptimize the network diminishes."

Harder notes that periodic reconfiguration of bulk calling service trunks is not practical for medium-sized and small user locations that call long-distance more than 500 hours per month. "Who wants to spend the time to reoptimize?" he asks.

"To reoptimize, the user will probably need to purchase network design software, acquire a call-detail recording system and hire someone who is experienced in this type of network redesign," Harder argues. "Why not just have these sites use a virtually banded [bulk calling service]? This way the communications manager doesn't have to worry about how much traffic is directed to each band."

Harder notes substantial increases in traffic can be handled over T-1 access lines without threat of overflow and with only an incremental fluctuation in the usage cost element of the virtually banded service. "If 50 hours of traffic were loaded onto the T-1, which had been carrying 1,000 hours of traffic per month, there would be no problem," he says.

Users can realize additional savings by accessing a bulk calling service using either T-1 or analog lines to access the long-distance carrier central office that provides the desired service. Use of dedicated T-1 lines in place of switched access to reach this point-of-presence has surged in popularity.

☞ See **Buying** page 28

Buying from **page 27**

The advantages of this access method are derived from splitting the T-1 link into 24 or more voice-grade channels. Durgee says, however, that the practicality of using T-1 access to bulk calling service depends on the distance between the user location and the central office offering the service, and on the volume of traffic the user can load onto the T-1 link.

"The user must be fairly close to the central office offering the desired service because the number of voice-grade channels on the T-1 link that justify dedicated access increases as this distance increases," Durgee explains.

Telco Research's Harder claims T-1 access to bulk calling services becomes more practical than switched access, where the user can load 1,000 or more hours of long-distance traffic onto the T-1 line. "At 1,000 hours per month, the user is not filling the T-1, but he could be saving much money," he explains.

Numerous bulk calling services, such as AT&T's Pro America I, II and III offerings, MCI's WATS service and Western Union Corp.'s Optimized WATS II, can be accessed using switched facilities. Others, however, such as AT&T's

Bulk calling services and features

		Charges			Access method		Service type		
Vendor	**Service name**	**Monthly (per line)**	**Non-recurring**	**Installation**	**Switched**	**Dedicated**	**Banded**	**Virtually banded**	**Minimum usage charge per line**
AT&T Communications, Inc. Bedminster, N.J.	Pro America I	$12.75	$10 service order charge	None	✓			✓	None
	Pro America II	$85	$10 service order charge	None	✓			✓	None
	Pro America III	$350	$10 service order charge	None	✓			✓	None
	WATS	$36.40	$99 service order charge, $138 connection charge per access line	None		✓	✓		None
	Megacom	$970	$545 service establishment charge, $99 service order charge	None		✓		✓	None
Allnet Communications Services, Inc. Birmingham, Mich.	Maxcess I	$870	T-1 access fee (billed by LEC*), central office connection fee of $270 per T-1, access coordination fee of $180 per T-1	Current LEC rate		✓		✓	None
	Maxcess II	$130	Access fee (billed by LEC)	Current LEC rate		✓		✓	None
	Maxcess III	$37.50, $25 per account	$50 per order	$50 per line		WATS access line		✓	None
	Maxcess III Plus	$60 per account	$50 per order	$50 per account		✓		✓	None
ITT United States Transmission Systems, Inc. Secaucus, N.J.	USA 300	$100 to $110	None	$100 per line		✓	✓		$300
	USA 1200	$75 to $110	None	$100 per line		✓	✓		$1,200
	Smart WATS	$100 to $120	None	$100 per line		✓		✓	$300
	Preferred WATS	$925 service charge, $60 LEC charge, $15 analog access charge, $110 charge	None	None		✓		✓	$600
MCI Communications Corp. Washington, D.C.	Prism I	$950	$50 per order	$50 per line		✓		✓	None
	Prism II	$130	$50 per order	$50 per line		✓		✓	None
	Prism III	$35	$50 per order	$50 per line		WATS access line		✓	None
	Prism Plus	$75 account fee	None	None	✓			✓	None
	WATS	$100	$50 per order	$50 per line	✓		✓		None
US Sprint Communications Co. Kansas City, Mo.	Dial 1 WATS	$56.40 (per location)	None	None	✓			✓	None
	Advanced WATS	$100; $20 band charge	None	$120 per line		✓		✓	$200
	Advanced WATS Plus	$36.40	None	$120 per line		✓		✓	None
	Banded WATS	$100; $20 band charge	None	$120 per line		✓	✓		$200
	Ultra WATS	$870	$5 for analog access line connection	None		✓		✓	None
Western Union Corp. Upper Saddle River, N.J.	Optimized WATS I	$100	None	$150 per line		✓		✓	$250
	Optimized WATS II	$20 for first four lines, subsequent fees are waived	None	$10 per line	✓			✓	$10

* LEC Local exchange carrier

Rates listed are as of March 1, 1987. All information provided by long-distance carriers.

SOURCE: TMS CORP., DEVON, PA.

Megacom; MCI's Prism I, II and III; US Sprint's Ultra WATS; and ITT United States Transmission Systems, Inc.'s (USTS) USA 300, USA 1200 and its WATS-like services, can only be tapped by using dedicated facilities such as T-1 lines.

Line averaging

Users struggling to minimize the cost of bulk calling services may wish to check which carriers perform line averaging to determine the user's bill and which service providers base their billing on the amount of traffic carried by a single line group. Line averaging is a method used to determine usage for banded bulk calling services.

AT&T, MCI and US Sprint claim they no longer partake in line averaging. Western Union and ITT USTS are examples of two bulk calling service providers that still perform line averaging on specific services.

Line averaging works as follows: If User A has 10 Band 5 lines, each of which carries 70 hours of traffic per month, the total use of this line group would be 700 hours. This sum would then be divided by the number of Band 5 lines (10) to arrive at an average per line use of 70 hours.

If this carrier had discount levels at 25, 70 and 100 hours of use, the first 25 hours would be billed at the first rate, and the next 45 hours would be billed at the second rate.

Under the billing plan used by AT&T since Jan. 1, the 700 hours would be billed quite differently, allowing users to realize far larger savings than with line averaging.

Assuming the same discount levels, explains The Aries Group's Durgee, the first 25 of the total 700 hours would be billed at the first rate, the next 75 hours would be billed at the second rate, and the remaining 600 would be billed at the 100 hours and over rate.

Although this marked difference in billing approaches mainly impacts users of banded services, Durgee said these dissimilar billing methods do not apply to virtually banded offerings. Use of virtually banded services is determined by the distance of calls made, not by specifically breaking up aggregate usage by line or by line group.

Shop around

Users shopping for a bulk calling service may want to play certain carriers against one another — a method used by automobile purchasers — to get the best buy.

Unlike AT&T, which pitches its bulk calling services to the masses, its competitors, including MCI, Western Union, Allnet Communication Services, Inc. and ITT USTS are working feverishly to differentiate their offerings by means of innovative packaging, creative promotions and marketing honed to specific user industries.

These carriers have embarked on a "Let's Make A Deal" program for selling their bulk calling offerings. Joe Lopez, long-distance services vice-president for Western Union, says the carrier packages its bulk calling offerings with popular call-detail recording gear it purchases from an outside vendor. This package, he says, is sold largely to the hotel/motel industry.

"This industry is a likely candidate for bulk calling service discounts because most of those who stay at hotels and motels place their calls after the normal nine-to-five daytime business hours," Lopez explains. Rates for most bulk calling services are established for daytime calling, evening calling and weekend calling.

MCI pitches Hotel WATS and University WATS, which are both banded bulk calling services. The two separately tariffed services provide users with banded WATS service at virtually banded WATS rates.

Bill Kidder, WATS product manager for MCI, notes that both offerings have maximum usage ceilings for daytime calling.

These penalties are used to discourage these users from making calls during traditional business hours.

Free installation

MCI, US Sprint and ITT USTS have periodically waived their one-time access line installation fees, which are roughly $50 per line, as a means of luring users to their offerings and keeping them aboard once they subscribe to the individual carrier's service. Kidder said users of MCI's bulk calling services are somewhat reluctant to leave the carrier for AT&T because they would have to pay an installation charge per line for use of AT&T's services.

Western Union's Lopez claims groups of users interested in the carrier's services will receive better deals as a group for Western Union services than they would if each user subscribed individually. The hitch is that one user must sign on the dotted line for his own company and on behalf of all users in the group.

Before penning a pact for one or more of the above-mentioned offerings, the communications manager should look beyond the enticing service promotions — check behind Doors 1, 2 and 3 — to make sure the service provider is more than just a Monty Hall clone. ◼

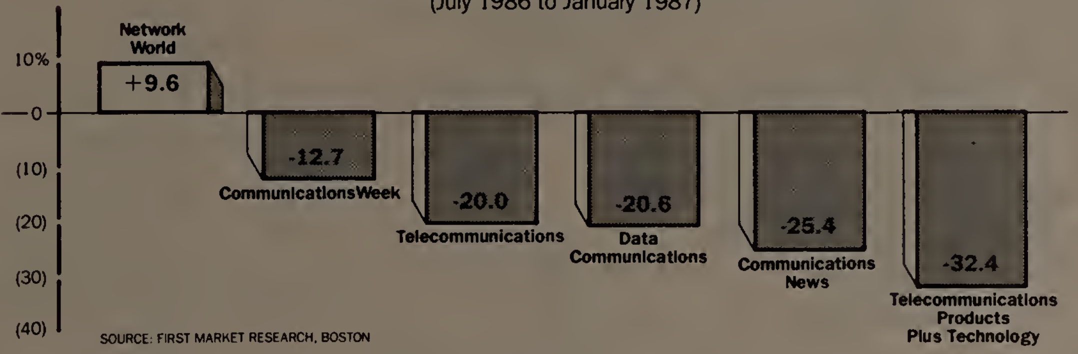
NETWORK WORLD
375 Cochituate Road, Box 9171/Framingham, MA 01701-9171/(617) 879-0700

February 23, 1987

Thanks for making us No. 1 in readership growth.

Thanks for making us the only publication growing in readership.

Percentage change in regular readership
among International Communications Association members
(July 1986 to January 1987)



SOURCE: FIRST MARKET RESEARCH, BOSTON

Dear ICA member,

It took you only 10 short months to endorse the concept of networking over the passing notion of plain old communications.

For most of you, networking means much more than just computers and communications. Networking is a business strategy. The goal: to link people and information for bottom-line benefits.

The shift to networking shows in your reading habits. In less than a year, you have embraced *Network World* in such large numbers that all our competitors are actually losing readers.

It's not that they haven't tried to imitate us. Our competitors are often our biggest followers. While imitation may be the sincerest form of flattery, no other publication matches the depth or scope of *Network World*'s networking coverage.

Thanks for giving us readership leadership. Thanks for making us No. 1.

Sincerely,
Bruce Hoard
Bruce Hoard
Editor

Now Network World puts a powerful new research tool right at your fingertips.

Network World's new SearchLink service gives you easy access to more than 800 databases in just minutes!

There's a wealth of useful information being gathered on electronic databases every day. But getting access to it hasn't been easy. What databases have the answers you need? How do you get access to them?

The answer is SearchLink. SearchLink gets you answers to all kinds of questions that are important to your business. You can get competitive information, or details about new products and services, or market facts, or the latest FCC regulations. You can get information on computers, finance, business statistics, investments, law and much more. Everything from accounting to trademarks to history or geography.

SearchLink offers you easy access to the services of leading database vendors including BRS; Dialog; NewsNet; SDC; VU/TEXT; and Questel, to name just a few. All you need is a credit card and a computer with modem.

All this, and more, with just one call!

SearchLink is easy.

No subscriptions. No passwords. All you do is call 800-843-7337 with your modem. Have your major credit card ready, and within a few minutes you'll be cleared to use SearchLink. Simple instructions tell you how to go after the information you need.

Using SearchLink is as easy as knowing what you want to find out. You pick the subject; SearchLink shows you what's available. Then you pick what you want to see.

If you know which database you want to access, SearchLink lets you specify that. If you're not sure, SearchLink can choose the database(s) to search.

SearchLink is inexpensive.

Considering that you could easily spend hundreds of dollars worth of your time with conventional research methods and still not get what you want, SearchLink could be the biggest bargain going. SearchLink costs only $7.99 per topic searched (a few databases carry surcharges), plus 25 cents per minute connect time, and $2 per abstract you choose to see. You can even get hard copies if you want them.

SearchLink provides 24-hour on-line assistance.

If you get into trouble, just type "SOS" and a real, live search specialist will come on-line to answer your questions.

Here's just a small sample of the databases you can access through SearchLink. A complete list is available on-line on SearchLink.

We can't list all of SearchLink's more than 800 databases, but just to give you an idea, here are *some* of the databases available under the topic "COMPUTER."

Business Software Database
  Software Packages for Minis and Micros
COMPENDEX*
  Engineering and Technology Information
Computer Database
  Computers and Telecommunications
COMPUTERPAT
  U.S. Data Processing Patents
INSPEC
  High Technology Topics
Menu—The International Software Database
  International Software Listings
Microcomputer Index
  Business, Education, and Home Computer Topics
Online Microcomputer Software
  Software Descriptions and Reviews
SUPERTECH
  AI, CAD/CAM, Robotics, and Telecommunications

And here are just a few of the other popular databases you can access with SearchLink:

ABI/INFORM
  Business and Management Topics
Chemical Abstracts
  Index of Chemistry Articles
Disclosure
  (Selected Databases)
Donnelley Demographics
  U.S. Census Information
Dun & Bradstreet
  (Selected Databases)
ERIC
  Educational Topics
PTS PROMPT
  Business and Market Information
Standard and Poor's Corporate Descriptions
  Information on U.S. Corporations
Trademarkscan
  Active U.S. Trademarks
TRINET
  Information on U.S. Companies

Here are some of the major database vendors accessible through SearchLink:

ADP Network Services
BRS Information Technologies
Data-Star
Datasolve Information Online
DataTimes Information Network
Dialog Information Services, Inc.
G-Cam Serveur
NewsNet, Inc.
Pergamon InfoLine
Questel, Inc.
SDC Information Services
VU/TEXT Information Services

Call 800-843-7337 now!

Put the power of knowledge to work for you right now. Call 800-843-7337 (THE-SEER) on your computer and get the answers you need to stay ahead.

SEARCHLINK
From Network World
Your link to the world of information.

An International Data Group Service
SearchLink is sponsored by the National Federation of Abstracting and Information Services.
NFAIS is a professional association of database producers.

NETWORK WORLD
A CWCI Publication
An International Data Group Company

For more information about SearchLink BY VOICE, dial 617-879-0700.

▶ *SMART CARDS*

Memory cards graduate to supersmartness

But is the real world ready for the technology?

Continued from page 1

dated, she uses the card to access the company's teleconferencing service for the afternoon meeting with the European staff.

These two applications are made possible by newly developed "supersmart" cards, which incorporate Electronically Erasable Programmable Read-Only Memory (EEPROM) as well as a microprocessor, and which may contain such features as an integral keyboard. The appeal of packing more power and memory between plastic wafers has brought an explosion of supersmart card devices, some incorporating memories of 32K bytes or more.

EEPROM memory is the communications industry's major technical innovation. EEPROM has two crucial advantages: It is reusable, and its memory remains intact without a continuous source of power. For these reasons, manufacturers are quickly moving to enter the EEPROM card market. In the U.S., EEPROM card suppliers currently include Smart Card International, Inc. (SCI), Cat-

☞ See **Memory** page 32

Knapp is assistant editor, communications alternatives, and Pringle is associate editor, international publications, for Datapro Research Corp., a subsidiary of McGraw-Hill Information Systems Co. in Delran, N.J.

1987 MATTHEW PIPPIN

Memory from **page 31**

alyst Semiconductor, Inc., Multimil, Inc. and AT&T.

The Ulticard marketed by SCI of New York is one of the purest examples of the supersmart card. With 64K bits of EEPROM memory and its own keyboard, LCD display and integral battery, this multichip card is being considered by VISA International, Inc. for use as a multifunction financial transaction device.

Dick Sprague, SCI's senior vice-president of marketing and business development, prefers to call the card a third-generation card, to distinguish it both from EEPROM cards and from those EEPROM cards that do not incorporate a keyboard display.

Catalyst Semiconductor has developed a card technology that has important implications for telecommunications. The company has combined EEPROM memory, processor and I/O on a single chip. Nick Samaras, director of strategic marketing and applications for Catalyst Semiconductor, claims this technology provides much greater reliability and security than the multichip solutions offered by other vendors.

In a multichip solution, he states, "you have reliability problems with chip-to-chip connections. The bonding between the chips is subject to breakage."

Furthermore, multichip cards are less secure. In a multichip card, "one could actually take apart the card, and with the appropriate instrumentation, gain access to the smart card's information," Samaras says. With a single-chip card, he concludes, there is "absolutely no way that anyone can read the contents of the ROM."

Smart card made simple

The classic smart card, developed in 1974, is exemplified by the Bull CP 8 and similar cards offered by Philips Industries, N.V. and Schlumberger Ltd. These smart cards, which generally cost less than $4, use six contact points, of a possible eight, to provide serial asynchronous communications between the card's processor and an external device such as an automated teller machine or a card reader.

Within the card itself is an 8-bit microprocessor and 21,088 bits of memory, consisting of 12.8K bits of ROM, 288 bits of random-access memory and 8K bits of Electronically Programmable Read-Only Memory (EPROM). A newer version of the Bull CP 8, scheduled for production by Microcard Technologies of Dallas in 1987, offers 36K bits of memory.

These EPROM cards have several simple, direct and cost-effective applications. In France, Bull and Philips smart cards are used to control access to the Teletel videotex network, to make payments for network use and to control account debiting for remote purchasing of retail goods. For telecommunications, the cards are programmed as user tickets that allow calls to be made at special card telephones until the card's prepaid value in francs is met.

Mastercard International, Inc. is also testing Bull EPROM cards in the U.S. For simple network access functions, transaction control and recording required for use as credit cards, the CP 8-style cards are proving to be serviceable and, relative to other cards, inexpensive. For more advanced communications tasks, however, they are of limited use.

Their major limitation is the EPROM memory. EPROM cannot be erased or altered. As an updatable directory of telephone numbers, for example, this type of card is unsatisfactory. A card intended for any but the simplest functions must have a reusable memory, such as that offered by EEPROM.

The shape of cards to come

The corporate communications card of the future will be a contactless EEPROM-based supersmart card with a reusable memory. A contactless card is one in which the card interface does not actually touch the card reader. Contactless cards have distinct advantages in adverse communications environments. They are impervious to dirt, moisture, grease and abrasion, and they provide protection from electrostatic discharge and other contamination.

The Ulticard is one of the purest examples of the supersmart card.

One example of a contactless card has been offered in the U.S. since January 1986 by Orientation, Inc. in Hudson, Mass. This card, manufactured by Nippon LSI of Japan, is available with either an 8K- or a 32K-byte nonvolatile CMOS RAM.

The card communicates by way of four electromagnetic coils with the following functions: read, write, switch read/write and power and clocking. It communicates at 500K bit/sec in half-duplex mode and is powered by an integral lithium battery with an expected life of five years. All of the components are embedded in plastic resin, and none make direct contact with an external device. For quantities of 5,000, each card costs $24 for the 8K byte and $29 for the 32K byte.

Mark Johnson, spokesman for Orientation, says that his company is targeting the Nippon LSI cards at the factory environment. According to Johnson, they are particularly well suited for it because of their reliability under adverse factory conditions.

Stephan Seidman, editor of the newsletter "Smart Card Reports," says that he expects to see an increasing number of vendors supplying smart cards for network access control. If the size of the card is increased slightly from the current International Standards Organization smart card standard, Seidman says, it can be used to replace any programming equipment. On the factory floor, process automation applications can be implemented by placing the entire control program on the card.

Earning supersmart status

The first card to merit the label "supersmart," and the most advanced in terms of commercial application, is the Memocard, a contact card with an 8-bit processor manufactured by Multimil International of Switzerland and launched in the U.S. market in 1985. The Memocard uses nine contacts located on its edge. It provides serial asynchronous communications at up to 4.8K bit/sec and supports RS-232 and IBM Personal Computer board interface attachments. It offers EEPROM of either 2K or 8K bytes.

Multimil has targeted its card almost exclusively at the telecommunications market. A desk phone, the Multimil 2048, was one of the first fruits of its development efforts: This digital desk phone with Memocard interface offers speed dialing, least-cost routing, call detail storage and appointment calendar functions.

Since access to some features of a private branch exchange and to specific telephones in the corporate network may be restricted, corporate managers can use the Memocard to store override codes that will allow them to access the features from any point in the net.

Tools & Techniques, Inc. of Austin, Texas is also at work upon a data base management system, called Dataplex, in which the Memocard will perform a peripheral, but interesting, function. By way of a software interface to the data base, records stored on the smart card can be transferred to the data base, making the card not only an access device, but a storage device, one node in a distributed data base in its own right.

Recently, those companies that are developing cards for telecommunications markets have shown a marked preference for both EEPROM memory and contactless interface technology. In the UK, for example, General Electric Co. plc (GEC) has developed a supersmart card that combines 64K bits of EEPROM memory with a contactless interface-based inductive coupling.

In North America, the most wide-ranging trial of the communications capabilities of this new type of supersmart card is now being conducted by AT&T. A project team is evaluating the usefulness of contactless EEPROM cards as access and storage devices in a telecommunications information service offered across the U.S.

Trials are now under way in several dozen U.S. cities, using a specially designed contactless card with 2K bytes of EEPROM memory. This AT&T E-Card uses a Unix-like operating system, and in the current trials, it interfaces with a modified version of AT&T's Card Caller telephones, called Public Phone Plus. Powered by inductive coupling, this card uses capacitive coupling to transfer data. An RS-232 interface in a special read/write module provides the link to the terminal.

In the test, the terminal is a telephone, but it could just as well be a personal computer, point-of-sale terminal or other device. Public Phone Plus installations located in major airports provide the display screen for the card's menu of functions, accessible through the phone's keypad.

In the test, AT&T offered the E-Card to 1,000 business travelers. On these cards, AT&T implemented such functions as speed-dialing and subaccount billing. Joe Griffin, project director for AT&T Smart Card Systems, says that these applications were selected as being immediately useful in corporate communications, though they are peripheral to what he sees as the card's baseline transaction and financial services applications.

Put the two types of applications together, however, and a glimpse of the communications card of the future appears. Griffin notes that AT&T Bell Laboratories is at work on a 10K-byte memory card, and he foresees the culmination of AT&T's effort to be the creation of a true "multiple application card": not only a telecommunications memory and access device, but, he says, "a distributed portable data base" that could use "terminals already out there" in the form of Public Phone Plus, an AT&T offering currently being tested that would accept smartcards.

John McCrindle, general manager of GEC Card Technology, expresses similar views concerning the need for multiple applications. He notes that, "In some respects, it is difficult to cost-justify a single application," and he sees the card's use as a portable data base to be perhaps its most marketable application.

Opening the door to innovation

If the words "development," "test" and "trial" predominate in discussions of smart cards, it is because the technology has not yet yielded concrete results. The applications now implemented by Multimil and under test by AT&T are straightforward and, in many instances, cost-effective. Beyond these, the new EEPROM technology opens the door to innovation.

In the interim, card manufacturers are doing their best to assist would-be innovators by providing development kits. Multimil, for example, offers a development kit for under $500 that consists of a Memocard, a read/write interface, a set of technical specifications, and an IBM or Apple diskette with sample programs and encryption algorithms. Orientation offers a similar fit for its Nippon LSI cards.

The application of supersmart cards to communications, then, is taking place in a technology-driven market. The coming year may see a flood of new product and service announcements as development shops bring their smart card wares to market. Or it may reveal that the technology has surpassed the ability of today's communications market to absorb it.

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

Qualification Form for Free Subscriptions.

Please answer **ALL QUESTIONS,** sign and date the card.

Free subscriptions will be accepted only from individuals in the U.S. and Canada with active professional or managerial responsibilities in communications. The publisher reserves the right to limit the number of free subscriptions accepted in any business category. To qualify, you must answer all the questions below completely, **sign and date this form.**

If address has changed, attach mailing label with old address here.

☐ Address Change ☐ New subscription

First Name	Middle Initial	Last Name
Your Title		
Company Name		
Div. Dept		
Street Address		
City	State	Zip Code

Is the above your home address? ☐ Yes ☐ No

I wish to receive a subscription to *Network World:* ☐ Yes ☐ No

Signature ____________________

Title ____________________ Date __________

Business Phone (______) ________________

PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.

1 My primary areas of activity. (Circle ONE only)
I am involved in evaluating communications (data, voice and/or image) products and services:
1. for *use within my own* company/organization
2. for *resale* to other companies/organizations
3. Both
4. Other (explain) ________________

1a For communications, my primary responsibility is: (Circle ONE only)
1. Data Communications
2. Voice Communications
3. Both
4. Other (explain) ________________

2 Circle only the ONE title classification which most applies to you.

Company Management
11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications
21. Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff:
Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications
31. Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks. Engineering, Design, R&D, Application Development
32. Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications
41. Management
42. Supervisory/Staff

MIS/Data Processing
51. Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications

Others
75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other ________________

3 Job Function
Which one of the following best describes your functional involvement with communications (data, voice, and /or video) products? (Circle ONE only)

Corporate
1. Business Management, Planning and/or Development

Communications System/Network
2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other ________________

4 Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)

Consultants
11. DP/Communications Consulting Services
12. Consulting Services (except DP/ Communications)

End Users
13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

Vendors
41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other ________________

5 In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)
1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

6 Check ALL that apply in columns A and B.
A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:
B. These products and services are presently in use at this location:

A B Product/Services

Computers
01. ☐ ☐ Micros
02. ☐ ☐ Minis
03. ☐ ☐ Mainframes
34. ☐ ☐ Printers

Data Communications
04. ☐ ☐ Communications Processors
05. ☐ ☐ Comm./Networks Software
06. ☐ ☐ Digital Switching Equipment
07. ☐ ☐ Facsimile
08. ☐ ☐ Modems
09. ☐ ☐ Multiplexers
10. ☐ ☐ Protocol Converters
11. ☐ ☐ Network Mgmt. & Control
12. ☐ ☐ Test Equipment
13. ☐ ☐ 3270 Controllers
35. ☐ ☐ Intelligent Terminals

Telecommunications
14. ☐ ☐ PBXs
15. ☐ ☐ Key Systems
16. ☐ ☐ Central Office Equipment
17. ☐ ☐ Integrated Voice/Data Terminals

A B Product/Services

Transmission/Network Services Equipment
18. ☐ ☐ Microwave
19. ☐ ☐ Satellite Earth Stations
20. ☐ ☐ Local Area Networks
21. ☐ ☐ Wide Area Networks
22. ☐ ☐ Packet Switching Equipment
23. ☐ ☐ Fiber Optic Equipment
36. ☐ ☐ T1

Communications Services
24. ☐ ☐ Packet Switching Services
25. ☐ ☐ Cellular Mobile Radio Services
26. ☐ ☐ Electronic Mail
27. ☐ ☐ Enhanced Services
28. ☐ ☐ Centrex
29. ☐ ☐ Long Haul Services
30. ☐ ☐ BOC Services
31. ☐ ☐ Independent Telco Services

Other
32. ☐ ☐ Factory Communications
33. ☐ ☐ Online Data Bases

7 Estimated value of communications systems, equipment and services:
A. which you helped specify, recommend or approve in *last* 12 months? (Check only ONE in column A.)
B. which you plan to specify, recommend or approve in *next* 12 months? (Check only ONE in column B.)

A B
1. ☐ ☐ $10 million and over
2. ☐ ☐ $5 million - $9.9 million
3. ☐ ☐ $1 million - $4.9 million
4. ☐ ☐ $500,000 - $999,999
5. ☐ ☐ $250,000 - $499,999

A B
6. ☐ ☐ $100,000 - $249,999
7. ☐ ☐ $50,000 - $99,999
8. ☐ ☐ Under $50,000
9. ☐ ☐ Don't Know

8 Estimated gross annual revenues for your entire company/institution:
(Circle ONE only)
1. Over $1 billion
2. $500 million to $1 billion
3. $100 million to $499.9 million
4. $50 million to $99.9 million
5. $10 million to $49.9 million
6. $5 million to $9.9 million
7. under $5 million

9 Estimated number of total employees at this location:
(Circle ONE only)
1. Over 5,000
2. 1,000 - 4,999
3. 500 - 999
4. 250 - 499
5. 100 - 249
6. 50 - 99
7. 20 - 49
8. 1 - 19

3A06-86

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES
P.O. BOX 1021
SOUTHEASTERN, PA 19398-9979

PLACE
POSTAGE
STAMP
HERE

▲
FOLD HERE AND MAIL TODAY

STOP. Did you do the following:

1. Supply old and new address if address has changed
2. Answer all questions
3. Sign and date form

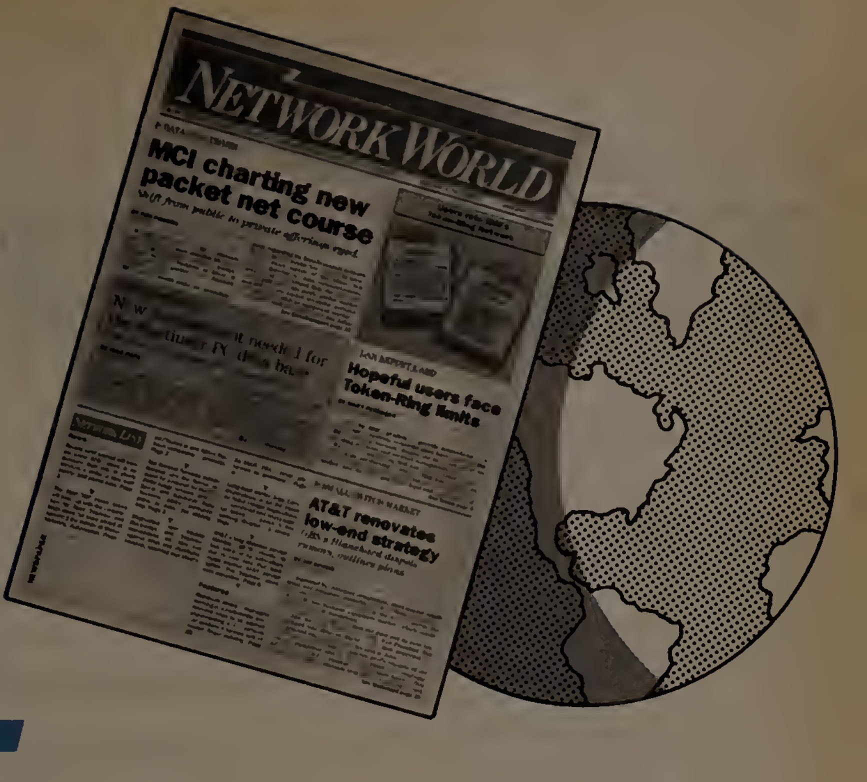
Enclosed is my:
- ☐ Address change.
- ☐ New subscription request.

THANK YOU.

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

PLEASE TAPE HERE
▲

As networking takes over the world, Network World takes over the market.


NETWORK WORLD
MCI charting new packet net course
Hopeful users face Token-Ring limits
AT&T renovates low-end strategy

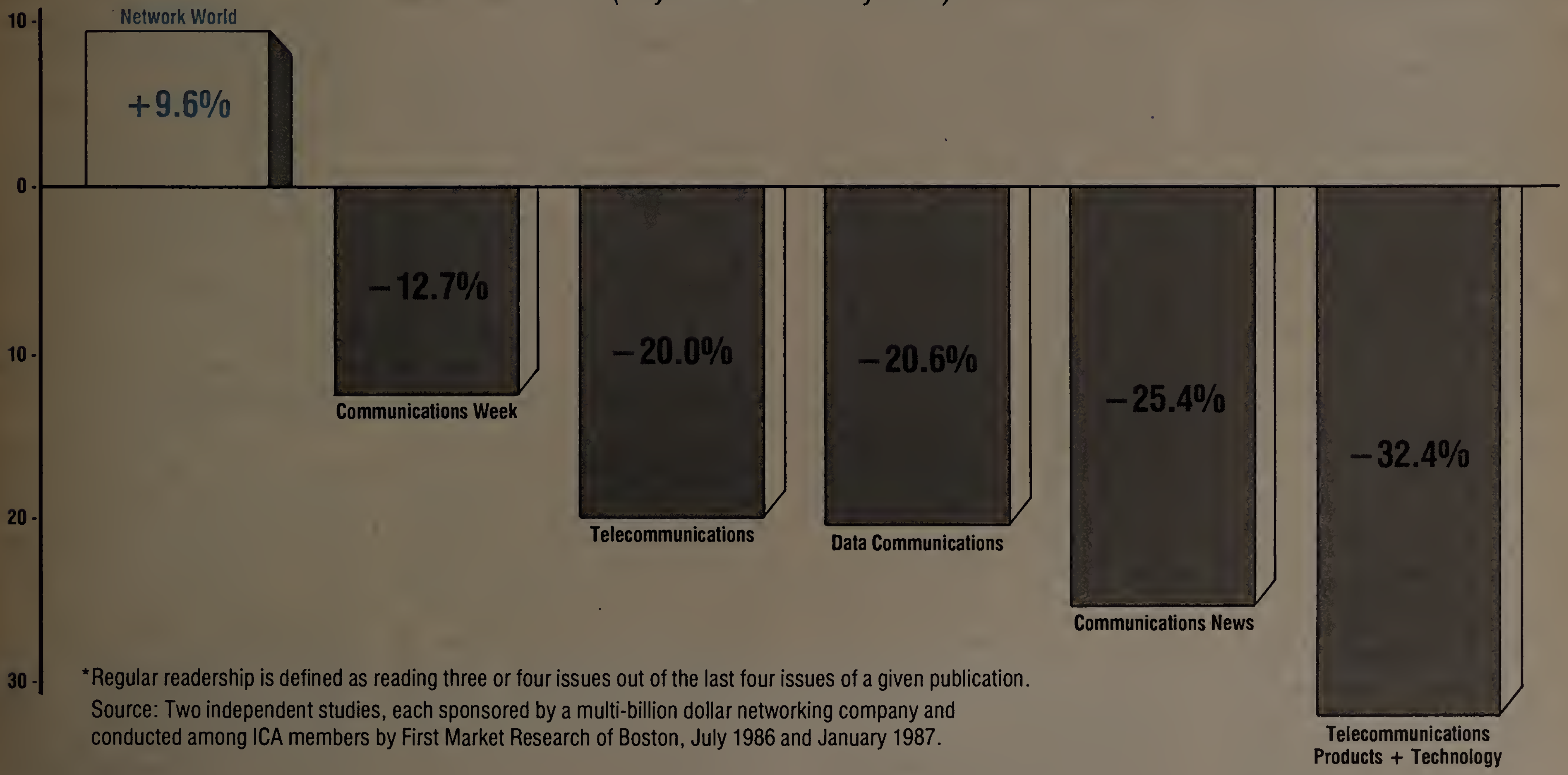
The trend has never been clearer. Networking is now the major application market for communications. And a recent statement by Ken Olsen, President and Founder of Digital Equipment Corporation, substantiates this trend: "We have to start thinking of the computers as peripherals. You start with the network, then you hang the computers on later."

Networking. It's been *Network World's* focus from the very start. In fact, it is the *only* publication that covers the entire realm of communications from the networking point of view. And in doing so, *Network World* has established itself as the *standard* for communications users already networked or planning to network.

Today's users know they need up-to-date information in order to keep pace with the evolving world of networking. That's why they read *Network World.* And that's why *Network World* was the only publication to gain in regular readership in an independent study conducted among ICA (International Communications Association) members, some of the nation's most influential buying decision-makers for voice and data communications products and services.

The study, sponsored by a multi-billion dollar networking company and conducted in January 1987 by First Market Research of Boston, showed decreased readership of all communications oriented publications among ICA members since a previous study in July 1986. Only *Network World,* with its exclusive networking-oriented coverage, experienced an increase in regular readership. The percentage increase/decrease for each publication over that six-month period is displayed in the following chart.

Percentage Change in Regular Readership* among ICA Members
(July 1986 vs. January 1987)



*Regular readership is defined as reading three or four issues out of the last four issues of a given publication.
Source: Two independent studies, each sponsored by a multi-billion dollar networking company and conducted among ICA members by First Market Research of Boston, July 1986 and January 1987.

Because networking is your business, we've made it our business. No other publication looks at the world of networking like we do. Today the network is the market – and the market reads *Network World.*

NETWORK WORLD
The Weekly for Leading Users of Communications Products & Services
375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700

A CWCI Publication
An International Data Group Company

▶ *CALIFORNIA CUTS*

CPUC tells General Tel to trim revenue $500m

BY JOSH GONZE
Staff Writer

SAN FRANCISCO — An advisory arm of the California Public Utilities Commission (CPUC) recommended that General Telephone Co. of California's allowable 1988 revenue be cut by at least $500 million, which would slash the carrier's rates by 30%.

The CPUC's Public Staff Division, a consumer advocacy group, said General Telephone, a GTE Corp. subsidiary, has not shown sufficient productivity gains from recent network modernization efforts. "Customers should be reaping the benefits produced by installation of modern equipment they have paid for over the past five years," a spokeswoman there said.

The recommendation, issued April 3, does not mandate a refund.

The spokeswoman charged that it is General Telephone's responsibility to "compare its operations with those of other telephone companies and to apply what it learns in terms of cost-cutting methods and operating efficiencies."

General Telephone provides intra-local access and transport area service to 2.5 million customers, primarily in Southern California. In January, the company filed with the CPUC for a $114.1 million reduction in 1988 revenue.

It has been converting its switches to digital in a modernization plan that began eight years ago, according to a General Telephone spokesman. The spokesman said that as a result of the conversion, "We have seen major benefits in customer service."

He said the company has reduced its work force by 3,000 since deregulation and will reduce it by another 1,100 by January 1988. About 24,000 are currently employed there.

"We feel our position for 1988 rates is on target and that the facts will bear out that our request is reasonable. We think our rate case plan is realistic and equitable for our customers in both the short term and in the future," he said.

The spokesman further defended General Telephone's position, stating that "saving money today could shortchange our customers' service needs tomorrow. Meanwhile, we still need a sizable work force to complete our equipment modernization program and equal access conversion program."

The CPUC is not bound by the group's recommendations and, in the past, has at times refused to follow them. A ruling is expected in late 1987.

> "Customers should be reaping the benefits produced by installation of modern equipment they have paid for over the past five years."

MCI from **page 1**

facturer Hercules, Inc. MCI would not say if it would add this third bird to its endangered species list, nor would it comment on future plans for it.

But even if MCI intends to keep SBS 3, like SBS 1 and 2, the satellite is running out of fuel and nearing the end of its expected life cycle. IBM retained SBS 4, 5 and 6 when it sold the company to MCI in the summer of 1985 in exchange for a 16% interest in MCI.

Houser would not reveal how the shift away from satellites will affect the company financially.

Besides planning to move traffic off current satellites, MCI has forfeited launch rights for planned satellites. MCI failed to provide the Federal Communications Commission with satellite design and construction information for the planned launch of SBS 7. In addition, the company has already returned a launch authorization to the FCC for SBS 8, Houser said.

Further, the company is attempting to sell off transponder capacity it owns on two other non-SBS satellites. MCI has received an agreement in principle from video programmer Viacom, Inc. that could result in the sale of seven of those transponders.

Former SBS service directors theorized that AT&T and US Sprint Communications Co.'s aggressive terrestrial network expansion programs dashed MCI's grand plans for SBS, once envisioned as the Cadillac of satellite networks.

Bill Rahe, former product manager for SBS' Communications Network Service B (CNS-B), a shared earth station service, questioned MCI's continued interest in using satellites for data traffic. "MCI's emphasis has always been voice, with a passing lip service to data. Anything they can replace with fiber they will," said Rahe, who is now vice-president of Enterprise Network Strategies with Gartner Group, Inc., a market research firm in Stamford, Conn.

The SBS satellite write-off is, however, not for naught. Rahe said MCI will incorporate SBS terrestrial switching facilities into its long-haul communications network. "MCI will certainly be able to use the 23 Northern Telecom, [Inc.] digital central-office switches once used to front-end satellite uplinks in the SBS network." Rahe estimated the switches are worth more than $100 million.

One former CNS-B project manager said the current problems with securing launch craft to carry communications satellites into orbit may have been a major factor in MCI's long-term satellite communications plans.

"SBS had originally wanted to become the high-speed gateway to the sky that would link [geographically dispersed] host computers together," the manager said.

The former project manager said propagation delay did not affect the quality of voice calls handled by SBS satellites. "It didn't have an impact on the voice calls because of the compression algorithms SBS used," he explained. "You could tell the call was made via satellite but it wasn't a disturbing problem." Propagation delays are common in satellite communications because signals have to travel 26,000 miles up to the satellite and back down to the destination.

NTI from **page 6**

has also worked with Apple Computer, Inc., Data General Corp., Prime Computer, Inc., Unisys Corp. and Wang Laboratories, Inc. to connect their computer systems to the SL-1ST.

With optional hardware, the switch will support Northern Telecom's LANSTAR PC local-area networking scheme, which links terminals to each other as well as to host computers and modem pools. Other optional hardware will allow the SL-1ST to support 3270 protocol conversion and emulation as well as provide a gateway to IBM System/36, IBM System/38 and X.25 public packet networks. Most of the software required to support these options is provided with the switch, but lays dormant until the proper hardware is added and the switch is reconfigured.

"It looks like they covered all the bases," said Everest Hunter of EC Hunter Associates, Inc., a Syracuse, N.Y., consulting firm. "Now they can go in and pick up IBM-type accounts."

The base SL-1ST CPU unit can support two to five 16-port line cards, providing a switch that ranges in size from 32 to 80 lines. The system supports two additional modules: one that expands the system to 240 lines and one that expands it to 400 lines. The firm will introduce an expansion cabinet this fall that will increase the SL-1ST's capacity to 600 lines.

Northern Telecom's Remote Peripheral Equipment will allow an SL-1ST expansion module to be located up to 70 miles from the central site, using T-1 digital links, and retain access to the main cabinet and system features.

Mitel from **page 2**

currently, users can have individual voice and data lines. In that scenario, a caller connected to a remotely located user can put a voice call on hold, dial his personal computer modem and press a swap key to initiate data communications.

Standard switch features packaged with the SX-50 include automatic route selection, incoming and outgoing station detail message recording, specialized switch software for hotel and motel applications, call forwarding, least-cost routing and direct inward system access. The SX50 will be available in June.

Data support is provided for RS-232-C-compatible terminals through use of Mitel's Dataset 1 and Dataset 2 telephone sets. These sets support asynchronous and synchronous data at speeds up to 19.2K bit/sec. Higher speed synchronous data communications features will be available in the third quarter of this year. The switch can also support T-1 trunk interfaces.

Fritz Ringling, director of strategies in telecommunications services and vice-president for the Gartner Group, Inc., a Stamford, Conn.-based communications consulting firm, said the SX-50 will serve as an excellent replacement switch for Mitel's huge installed base of low-end analog PBXs. "Many users of Mitel's low-end analog switches are ready to replace this equipment. This is a strong follow-up product for that segment of their installed base," he said.

Ringling, however, was less optimistic about the future of the SX-2000 ICS. "It is really too late for this PBX to compete with the low to mid-range switches pitched by AT&T, Northern Telecom, Rolm [Corp.] and NEC [Corp.]," he argued. "There is little product differentiation between the mid-range switches. The success of this Mitel switch depends on its price, quality and distribution system."

In a related announcement, the switch maker unveiled the Mitel Qualified Dealer network, which adds dealers as a fourth channel of distribution. Arthur Franks, sales support and product marketing assistant vice-president for Mitel, said creating a product distribution network has been a learning experience for the PBX maker. "Mitel has yet to master the distribution game," he admitted. "The Mitel Qualified Dealer network is our first venture into dealer PBX sales."

The vendor's current distribution system already comprises direct sales, independent sales agents and supply houses, which in turn, sell to interconnects and resellers.

Ringling faulted Mitel's new dealer network, which was put in place to sell switches in the under-250-line segment of the PBX market. "They should limit themselves to one or two national distributors," he suggested. "Our user clients tell us they are tired of receiving three or more PBX proposals from parties that are all trying to sell the same switch."

IBM from **page 1**

jian were available for comment.

The executive change comes on the heels of IBM's decision last month to transfer Rolm's 6,000-member sales force to a newly created division within IBM's Information Systems Group (see "IBM absorbs Rolm's reps," *NW*, March 16). Industry watchers say Rolm's independence has all but vanished as a result of such changes.

"Things are not going well for Rolm," said Maxwell Steinhardt, managing partner at CTPS, Inc., a Mountain View, Calif.-based consulting company. "These moves come at a time when IBM is keeping a particularly sharp eye on the performance of its units."

AbuZayyad, 49, has a background in engineering and oversaw manufacturing of IBM's storage systems. One of the first steps he is likely to take is to revamp Rolm's production operations to trim the cost of making the low-end CBXs, Steinhardt said. Analysts say the firm's manufacturing processes are inefficient and expensive.

Also, AbuZayyad will advance what Steinhardt said he believes is IBM's plan to transfer the intelligence of Rolm private branch exchanges to IBM hosts — wedding telecommunications and data processing environments, a key goal of the Rolm acquisition.

"IBM needs to have someone running Rolm who is going to do as he is told," said Steinhardt, alluding to rumors that Paboojian balked at IBM's plan to move intelligence out of the CBX and into the host computer.

"This is a continuation in the blueing of Rolm," said Frank Dzubeck, president of Communications Network Architects, Inc., a consulting firm located in Washington, D.C. Dzubeck predicted that the Rolm name may even be dropped soon by IBM.

When IBM acquired Rolm in 1984, industry observers predicted a clash of corporate cultures between the East Coast business giant and the free-wheeling Santa Clara, Calif.-based switch maker. Ian Angus, president of the Angus TeleManagement Group, Inc. in Toronto, said that differences in company styles were genuine.

But Angus agreed with Steinhardt that IBM's moves to assume greater control over Rolm are a response to real business problems, particularly Rolm's lackluster contribution to IBM's bottom line.

Gerald Mayfield, president of the Professional Services Division at DMW Group, Inc. in Stamford, Conn., said that while there has been criticism of Rolm's PBX-making operations, he views IBM's latest move as being driven by marketing and sales considerations.

"This gives them more of the appearance of a united front for their Enterprise Program," Mayfield said. The Enterprise Program, launched in 1985, calls for IBM and Rolm representatives to make joint sales pitches to large customers.

Angus said IBM's buyout of Rolm, one of the top three PBX makers in the world along with Northern Telecom, Inc. and AT&T, gave it a customer base and instant credibility as a vendor of telecommunications equipment.

"A lot of doors have been opened for Rolm products since the buyout," Angus said. "A lot of Rolm systems are going in through the MIS department door, instead of the telecom manager's door."

Edward Horrell, president of Mitchell & Horrell, Inc., a telecommunications consulting firm in Memphis, Tenn., questioned IBM's action. "Selling PBXs is not like selling mainframes," Horrell said.

"The IBM guys are not used to going in to a company and replacing an entire system. It is a whole other game when you either get the deal or you get nothing."

AT&T from **page 2**

ness, number of customers and network facilities.

While the report offered no interpretation of the financial results, AT&T Washington spokeswoman Edith Herman said, "Even though our revenues declined, we were still able to make a profit because we cut our expenses more than the drop in revenue. We were able to reduce customer rates and still increase our profits from the previous year."

Herman dismissed the idea that the revenue decline was the result of increased competition and loss of business to MCI Communications Corp., US Sprint Communications Co. and other long-haul carriers. "While it's true MCI and US Sprint have increased their market share, our actual volume of traffic has increased. The revenue decline is due to rate reductions," she said.

Gerald Mayfield, president of the Professional Services Division at DMW Group, Inc. in Stamford, Conn., attributed the revenue decline, at least in part, to loss of business to MCI and US Sprint. "They've taken business customers away from AT&T, and that's bound to affect AT&T's revenue," he said.

AT&T reported that:

- Revenue from toll services was $36.5 billion, down $255.8 million from the previous year. Of toll revenue, $27.8 billion was generated by interstate and foreign traffic.
- Message Toll Service revenue declined $618.7 million in 1986 to $22.9 billion, of which $16.6 billion came from interstate and foreign traffic.
- WATS revenue was $8.4 billion in 1986, down $127.4 million from the previous year. Approximately $6.7 billion of that total was derived from interstate and foreign traffic.

One bright spot on AT&T's balance sheet was an increase in private-line revenue, which was up $577 million from 1985 to $4.8 billion in 1986. Nearly all private-line revenue, $4.17 billion, came from interstate and foreign business.

Revenue from voice-grade private-line services increased $55.1 million, to $1.97 billion, and private-line data services increased $593 million, to $2.6 billion in 1986. Revenue from private-line users in the broadcast industry was nearly halved. AT&T revenue from television transmission was $69.78 million in 1986, reflecting a drop of $36 million from the previous year. Revenue from private-line audio transmission dropped $3.9 million to $5.9 million.

AT&T Communications' nonregulated businesses lost $4.1 million in 1986, compared with a loss of $928,416 a year ago.

In 1986, AT&T Communications had a total of 10,055 private-line customers. AT&T had 9,580 commercial customers and 400 in the federal government. The number of federal customers increased from 378 in 1985. The number of circuits used by the federal government decreased from 106,838 in 1985 to 100,643.

Use of data services over private lines increased from 2,091 in 1985 to 2,633 customers by year-end 1986.

AT&T Communications' overall operating expenses were $33.1 billion, down from last year. But its general administrative costs were up $240 million over the previous year to $1.12 billion. The company paid $19.6 billion to the Bell operating companies in access charges, reflecting a substantial reduction of $1.92 billion over 1985. AT&T Communications spent $3.8 million in connection with regulatory matters.

AT&T Communications spent $509.9 million on advertising, promotion and marketing, an increase of $70.6 million over 1985.

Users from **page 2**

Ohio. "With OS/2 in a workstation, users can do a lot of tasks simultaneously, such as calendaring, electronic mail and printing."

Limited appeal

As such, the new multitasking capabilities of Personal System/2 may be of limited appeal. "Typical office tasks don't require multitasking," said Jeff Sorensen, manager of end-user computing for the state government of South Dakota, "although being able to print in the background is a nice feature."

The real promise, however, is the merging of multitasking with other network functions, such as IBM's Advanced Program-to-Program Communications facility for Personal Computers and LU 6.2. In the future, it may be possible for a Personal System/2 outfitted with full function APPC/PC to be working in one application and, in the background, have that same application retrieve data from remote applications without the user knowing it.

For the present, OS/2 provides vendors with a standard that simplifies development of "more powerful servers without shoe-horning applications into single-tasking DOS," said Barry Trent, a systems specialist at Architecture Technology in Minneapolis.

Even with more powerful servers, Trent feels they will still be a potential bottleneck. "Larger files will be transferred between the server and network workstations and the server will be accessed more frequently. In this environment you'll still have to add more servers to increase network performance," he said.

Vendors who already offer multitasking network operating system software, such as Novell, Inc. and Banyan Systems, Inc., will not rewrite their networking software to OS/2, Boyd believes. "That would be a move backwards — like starting all over again without creating anything better," he maintained. "On the workstation side, these vendors support DOS and I'm sure they'll support OS/2, but they won't use OS/2 on their servers, because it's still not a true multiuser operating system."

Although server performance is critical, currently used IBM Token-Ring Network adapters may prove the ultimate bottleneck. "The real bottleneck is in how much time it takes to get information ready to put out on the network," Boyd said. "An 8-bit LAN card a year from now coupled with OS/2 will be on its back trying to keep up with the network load. A 16- or 32-bit card optimized to a bus structure such as the [Personal System/2's] Micro Channel will keep up just fine." Boyd believes the Token-Ring's 4M bit/sec data rate won't be a problem.

Limited availability

New high-performance network adapter cards will only be available for 80286-based ATs and the new Personal System/2 Models 50, 60 and 80, but this limitation is unimportant for some users.

Sorensen, who oversees a Token-Ring net linking 150 nodes in several interconnected rings, will continue buying 8088-based units. "The bottom line is performance and cost. They haven't shown me the performance improvements are worth the price," he said.

Others, such as Hartford, Conn.-based Travelers Corp., which has a Token-Ring installation supporting over 600 nodes, stopped buying PCs and XTs some time ago. "We've been buying ATs, which are compatible with the new system, to protect our investment," said Joe Brophy, senior vice-president at Travelers. "We will begin buying [Personal System/2] Model 50s and 60s when they become available."

These considerations only scratch the surface of what is to come. Although details of the extended version of OS/2 are sketchy, its inclusion in IBM's Systems Application Architecture and support of LU 6.2 protocols promises to integrate the personal computer more tightly with other processors. "The extended version of OS/2 will include a data base that uses SQL-like commands to query for data across a network — including minis and mainframes," said Boyd. With multitasking, such a query could be executed automatically in the background, while the user is working on another task in the foreground.

Manager from **page 1**

LAN Manager during the introduction of its Personal System/2 but seemed undaunted by it during a briefing here on the company's new products, including the multitasking MS OS/2 operating system, to financial analysts and reporters.

Microsoft Chairman Bill Gates said OS/2, coupled with LAN Manager, would be a powerful networking combination. "The same energy that caused MS-DOS to be a standard at the workstation level will make OS/2 a standard at the server level," he said.

Gates said the absence of a standard network operating system has limited the number of applications available to users and has limited networking to file and printer services. But, he said, new capabilities provided by the MS OS/2 and LAN Manager combination will change that.

If Gates is correct about LAN Manager's future role, the product will compete head-to-head against network operating systems such as Novell, Inc.'s NetWare. Microsoft's current networking software, MS-Networks, is not sold directly to users; it is licensed to OEMs. But a top official of the company last week raised the possibility that LAN Manager will be.

"Our initial marketing thrust will be through OEMs," said Steve Balmer, vice-president of systems software. "If it is appropriate, we may make it available as an end-user product." MS-Net, the company's current networking software, is sold only through OEMs.

But LAN Manager will not even be released to developers until the fourth quarter of 1987. "End users won't start to see the product until the first half of 1988," said Bob Clark, vice-president of The Seybold Group's marketing consulting division in San Jose, Calif.

"There are other vendors out there doing extremely well in that market, and I think those vendors will have products that go beyond what Microsoft will offer in 1988," Clark said. He added that the LAN Manager appears to be nothing more than a specification and that a Microsoft product manager acknowledged that development work had not yet begun on it.

LAN Manager will provide file and printer networking services between personal computers running either MS-DOS 3.X or MS OS/2. In conjunction with LAN Manager, Microsoft claimed, an MS OS/2-based system will be able to act simultaneously as a workstation and a file server.

MS-DOS workstations will be able to make calls to a server running OS/2 and the LAN Manager but will not be able to function as servers themselves. "We're moving all of our server work from DOS 3 to OS/2," Balmer said.

The LAN Manager will run on top of MS OS/2 and will be tightly integrated with it. As a result, it will be able to address large blocks of memory, as well as use the multitasking capability and protected mode of MS OS/2. These features will allow applications, such as data base management systems, to run on the server itself, as well as allow multiple functions to be processed simultaneously.

MS OS/2 also supports program-to-program communications, or interprocess communications, which will enable application developers to create a single application that can run in either a stand-alone workstation or network environment, according to Balmer. "I can write a program that knows about MS-DOS 3 or OS/2, and it will run across the network using the interprocess communications facility inherent in OS/2," he said.

According to Eric Killorin, publisher of "Netline," an industry newsletter on computer networks from Hyatt Research Corp. in Andover, Mass., the tight coupling of LAN Manager and OS/2 provides powerful performance and transparency benefits.

Perhaps more importantly, the close ties between MS OS/2 and LAN Manager put Microsoft "in a much better position, since OS/2 is the operating system that IBM is going to be promoting," Killorin said. He said he is confident IBM will use LAN Manager to support its network environment. "The extended version of OS/2 is the key operating system that IBM will use to combine APPC, NETBIOS and all the emulation programs." IBM has not commented on its commitment to LAN Manager.

LAN Manager supports interprocess communications, in part, through enhancements to networking protocols Microsoft developed for MS Networks, including the Redirector and Server Message Block. The key differences between LAN Manager and MS Networks is that LAN Manager will offer advanced security features, more powerful system administration features and better performance, Balmer said.

Microsoft will do well with the LAN Manager but may not pull off the setting of a net operating system standard, Seybold's Clark said. And, despite Microsoft's claim that LAN Manager is a full-blown file server, Clark maintains it is weak in terms of communications.

Ford from **page 2**

said the company will realize a variety of benefits from blending voice and data traffic on its proposed national T-1 net.

"By sharing high-speed digital transmission facilities as opposed to using analog circuits, we expect to reduce costs by up to 50%," Peterson stated.

"We believe that dedicated, leased networks are the most attractive choice for Ford because they allow us to avoid the capital and personnel investments required to operate private facilities," he added.

Ford said AT&T, MCI Communications Corp. and US Sprint Communications Co. are among the field of long-haul carriers currently being considered to provide the T-1 facilities for the national T-1 net. A Ford spokesman said the company will select a single vendor for this effort early this summer, and he added that the backbone net is expected to be completed in 1989.

Jim Soma, telecommunications services manager for Ford, said the company decided to standardize on two communications protocols: Systems Network Architecture for communications links between IBM computers, and X.25 for communications between computers made by Burroughs (now Unisys Corp.), Hewlett-Packard Co., Wang Laboratories, Inc. and Honeywell Information Systems, Inc.

Industry analysts said other major corporations probably will be following Ford's lead in the near future.

John McQuillan, president of McQuillan Consulting, a Cambridge, Mass.-based communications consulting firm, said large users would be the first to install these packet-switched T-1 networks. But, he added, users that spend more than $1 million annually on telecommunications will eventually follow suit.

"The first step users must take toward these types of networks is to use T-1 facilities," McQuillan said. "The second step requires T-1 users to consider using T-1 transmission facilities to support multiple networks. The final step is for these users to actually consolidate multiple networks on their T-1 systems."

Recent industry activity also illustrates the trend. A pair of major players recently took steps to brace for anticipated user demand for packet-switched nets sporting T-1 backbones.

Telenet hammered out a five-year contract to purchase T-1 networking components from Timeplex, Inc. at the Interface '87 conference in Las Vegas. The value-added net provider will now pitch private packet nets using US Sprint digital links to users.

BBN Communications Corp. recently announced its intention to purchase Network Switching Systems, Inc., a T-1 network component vendor. BBN would not say if it will offer private packet-switching/T-1 nets.

Dennis Best, data communications product planning director for Telenet, predicted demand for packet-switched/T-1 nets will soon rise sharply.

"The size of the potential community of T-1 networkers has increased dramatically because of this year's T-1 service rate reductions. This universe now represents 1,000 to 1,500 user companies."

BOCs from **page 4**

For each workstation linked in the star, the user must lease or buy a data-over-voice multiplexer, which has an RS-232 interface on the input side and an RJ-11 jack on the output side. A compatible multiplexer at the central office separates voice from data and sends each stream to the appropriate switch. Voice is sent in low-frequency analog form, while data, also sent in analog form, is sent at a higher frequency.

Typically, central office local network users are charged a flat monthly rate, which must be approved by state regulatory bodies. The rates differ according to the type of hook-up. Asynchronous and synchronous terminals, host ports and dial-up modems all have separate rates.

In some areas, such as the New England Telephone region, no tariff for synchronous transmission has been set, and the service is not available.

For users in the Bell Atlantic region, the monthly charge averages about $20 per port, according to Earnest Heatwole, product line manager for central office local networks at Bell Atlantic.

A Centrex data-switching service eliminates investment in special wiring for data and places the burden of maintenance on the telephone company. All central office services enjoy 24-hour-a-day remote maintenance, so users do not need their own on-site net administrator.

"CO-LANs offer an opportunity to have all the [maintenance] headaches taken away," said Victoria Marney-Petrix, a telecommunications analyst at Dataquest, Inc.

All central office local-area nets will be able to switch asynchronous data. Synchronous support varies from region to region. Bell Atlantic supports five synchronous protocols: 3270, 2780/3780, Synchronous Data Link Control, Digital Data Communications Message Protocol and BX.25, a variation of X.25. Nynex subsidiaries support only asynchronous data.

Technically, it is unnecessary for a user to be a Centrex customer. But regulatory tariff restrictions in some areas, such as the Nynex region, permit only Centrex customers to buy the central office-based local net alternative. Regulators in other areas, such as the Ameritech region, have created tariffs making both Centrex and non-Centrex customers eligible.

"We're not going to offer it only to Centrex customers; it's going to be a generic service offering. The Centrex customer is in a little bit better position because he has a Centrex line at every desk," said Dick Greczanik, product manager for local-area networks at Ohio Bell.

But Ameritech companies are still directing their marketing efforts at Centrex customers.

PBX users would have to assume the cost of additional trunks to act as data lines before they could take advantage of their central office's data-switching capabilities.

The BOCs are also positioning the product as an Integrated Systems Digital Network precursor. "The strategy behind all this is to presell ISDN," said Wayne Egan, staff manager at New England Telephone. Greczanik agreed, saying, "It's a nice evolution toward all these great networks of the future like ISDN."

CAREER ANNOUNCEMENTS

MANAGER
NETWORK PLANNING

Due to our continued growth, **The Commonwealth of Massachusetts' Office of Management Information Systems (OMIS)** has created a unique opportunity for a Manager, Network Planning. You will be a key individual in the planning, development, and implementation of a Statewide Data Communications Network. You will be working in conjunction with some of the top Data Communications Industry professionals from a subcommittee of the Governor's Industry Advisory Committee as well as representatives of the Commonwealth's major Data Centers on this important and highly visible effort.

The ideal candidate will have the following qualifications:

- Strong Data Communications experience in areas such as SNA/SDLC, T-1, X.25
- Successful experience planning a large, sophisticated network
- Experience with the Competitive Bid Process and serving on Selection Boards.

OMIS offers a highly competitive salary program through the Massachusetts Technical Pay Law, a comprehensive benefits package, and excellent training and development programs to enhance your continuing career growth.

For consideration, please forward your resume with a cover letter to: Bob Lippman, Recruitment Specialist, OMIS Office of Administration, One Ashburton Place, Room 411, Box NW, Boston, MA 02108.

OFFICE OF MANAGEMENT INFORMATION SYSTEMS

The Commonwealth of Massachusetts
is an Affirmative Action/
Equal Opportunity Employer

Data Processing is an Art of the State

Make the Warwick Connection

If you have a proven track record selling any of these companies' products — new or used —

CASE codex
general dataComm
Universal Data Systems
paradyne, etc . . .

and if a SIX-FIGURE INCOME interests you, call Warwick today for an appointment:

(201) 299-1244

Sales positions available on East and West Coasts

Warwick
DATA SYSTEMS, INC.
Denville Technical Park
66 Ford Road
Denville, NJ 07834

ATTENTION: T-1 PROFESSIONALS

Data-Tech Institute, a nationally recognized seminar company specializing in the education of Data and Telecommunications professionals is seeking individuals interested in developing and/or teaching T-1 seminars.

If you are interested in joining our staff of seminar instructors, please send resume to:

Data-Tech Institute
Lakeview Plaza
PO Box 2429
Clifton, NJ 07015

Attn: Joy Lind

Data-Tech Institute
LAKEVIEW PLAZA
P O BOX 2429 • CLIFTON.
Continuing Education for the Professional

SAUDI ARABIA

SYSOREX INTERNATIONAL, a California corporation and a rapidly growing systems management company, now developing innovative multi-technology systems in Saudi Arabia, has the following challenging positions:

Network Support Manager

This senior managerial position will require a suitably qualified Senior Engineer to support and develop the IBM PC, RACAL modem and Ungermann-Bass communications network. The successful applicant will need the ability to manage, lead and motivate a small team of engineers by example plus a strong organizational ability.

PC/Network Support Engineer

Position reports to Network Support Manager. Requires at least 5 years experience in two of the following disciplines:

- **IBM PC/XT/AT in a networking environment**
- **Data communications including RACAL modems**
- **LANs**
- **Ethernet protocols**

Both positions require an education to degree level or equivalent in a relevant field and a proven track record in a technical support role.

We offer an excellent benefit package including medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume with present salary, indicating position for which you are applying, to Personnel, SADC Project, Dept. NW-4/13, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Ave., Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. Principals only apply.

SYSOREX
Sysorex International Inc.

CLASSIFIED ADVERTISING
Information Form

Name______________________________

Title______________________________

Company______________________________

Address______________________________

____

Telephone No.______________________________

☐ Please send me more information on Classified Advertising.

☐ Please have someone call me with information.

Return to:

NETWORK WORLD
Classified Advertising
375 Cochituate Road
Framingham, MA 01701

ICA Show Issue
Special ICA Show Issue

Call for further information
on advertising in this Special Issue.

The ICA Show Issue - May 18th

Closes: May 8th

Bonus Show & Hotel Distribution

NETWORK WORLD

Contact: **Joan Pinsky**
Classified Advertising
375 Cochituate Road, P.O. Box 9171,
Framingham, MA 01701-9171
1-800-343-6474 (In MA) **617-879-0700**

Selling from **page 1**

managers must be when selling networking projects to upper level managers. Winning approval for such projects is an art, communications managers say, one that requires the manager to tailor the sales pitch to the mind-set of senior executives.

Some managers, as Colby did, focus their sales pitches on upper management's "hot buttons," or its chief concerns. Other managers say top executives must be shown how a networking project will help the corporation achieve its strategic goals. For others, carefully prepared cost and benefit studies are the most effective selling tools.

In Colby's case, bottom-line information alone wouldn't do the trick. "We could only justify a portion of the expenditure in hard-dollar terms of savings on clerical workers for telephone coverage," Colby said. But upper management took to the project when he explained how the voice mail system would make it easier for customers to reach employees.

"If a project has a payback of less than two years, it's a piece of cake to get it approved. If the payback is more than two years or has no tangible, hard-dollar payback, it's a different story," Colby said.

Jay Borden, manager of telecommunications for Colgate-Palmolive Co., agreed that tailoring a proposal to push the right senior management buttons is essential to success. "You can't sell upper management on the basis of technology alone. You must sell on the basis of meeting a business need, of solving a problem management is having."

Borden related how he won approval for an automatic call distribution (ACD) system. "We didn't push ACD technology. We sold it in terms that senior management understood," Borden said. "Technical aspects don't concern senior management. What you are addressing are their problems. Because management is solution-driven, not technology-driven, proposals must be presented in that way."

For Candy Rodgers, telecommunications manager with Del Monte USA in San Francisco, getting in tune with corporate strategy helped her get a $1 million telecommunications equipment appropriation accepted. Rodgers showed senior executives how the equipment expenditures advanced the company's strategic plans.

"Our management is strategy-oriented," Rodgers said. "In each of five proposals, the executives all thumbed through the business plan and situational analysis and went right to the strategy."

Rodgers' "big picture" approach was what Bill Reuter, assistant vice-president of telecommunications with Colonial Penn Group, Inc., one of the nation's largest direct-response insurance companies, used to push a proposal for a network linking the firm's offices nationwide. But, he said, upper management was more interested in the dollars and cents aspects of the project.

"We talked strategically, but our management measured the proposal tactically," Reuter said. "Benefits and cost were just as important to them as how the project fit into the overall business plan."

Where benefits weren't immediately demonstrable, Reuter said he made "a strong case that the project was a necessary first step to achieving future benefits."

The bottom-line payback was most important to Barney Leslie's senior management. Leslie, a project manager in the information technical division of TRW, Inc., got a $2 million broadband network proposal accepted by stressing how the network could save the company money.

"You may have the greatest technology in the world, but if it doesn't save the company some bucks, you're not going to be able to implement it," he said.

Communications managers agreed that sometimes it takes more than one voice to sell senior management on a networking project. Johnson Control's Colby worked with one senior manager who was highly interested in voice mail technology. That senior manager helped convince other members of the decision-making team to approve the project.

In the past, Reuter said, he has enlisted the aid of other department heads who would benefit from a project. For example, in trying to win favor for a telemarketing system, he allied himself with the marketing people that the telemarketing proposal would serve. "When someone from operations and someone from service are both saying the proposal is important, it generally works," he said.

Allying with the corporate financial people and a vendor helped Rodgers get her equipment appropriation approved. "By keeping the corporate financial department involved in the cost-justification phase, the chief financial officer knew what we were planning and wasn't surprised," she said.

Getting the vendor's participation also helped swing the proposal. "Our vice-president of information services wanted to talk to the vendor because he was unfamiliar with their product," Rodgers said. "I called the vendor representative and told him to have his VP call my VP right away," she noted. "It's essential to have peer-to-peer level conversation and communications all the way up the line." □

CALENDAR

April 14-16, Dallas — Consulting Skills for the IC Professional. Also, May 18-20, Chicago. Contact: Arnoudse & Ouellette, No. 66, 40 South River Road, Bedford, N.H. 03102.

April 14-16, Chicago — Telecommunications Transmission Systems. Contact: abc Teletraining, Inc., P.O. Box 537, Geneva, Ill. 60134.

April 15, Long Beach, Calif. — The T-1 Network Exchange. Also, April 16, Burlingame, Calif.; June 4, Denver. Contact: Avanti Communications Corp., Aquidneck Industrial Park, Newport, R.I. 02840.

April 15-16, Washington, D.C. — RBOC Diversification Strategies, 1987 and Beyond. Contact: TeleStrategies, Inc., 1355 Beverly Road, McLean, Va. 22101.

April 15-17, Boston — LANs. Also, May 13-15, New York. Contact: Institute for Advanced Technology, 1450 Energy Park Drive, St. Paul, Minn. 55108.

April 15-17, San Francisco — Local Area Networks. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402

April 20-22, Avon, Colo. — Data Dictionaries, Data Element Naming and Data Standardization. Contact: Barnett Data Systems, 19 Orchard Way North, Rockville, Md. 20854.

April 21-23, Chicago — How PBXs Work. Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

April 23, Boston — Fiber-Optic Venture '87. Contact: Kessler Marketing Intelligence, America's Cup Ave. at 31 Bridge St., Newport, R.I. 02840.

April 23-24, Washington, D.C. — Cashing in on Diversification: Winning Strategies in the New Telecommunications Marketplace. Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

April 23-24, New York — Networking Personal Computers. Also, April 30-May 1, Boston; May 14-15, Chicago. Contact: New York University, School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

April 23-24, Dallas — IBM's SNA. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 27- May 1, Arlington, Va. — Comprehensive Course in Data Communications. Contact: McGraw-Hill Information Systems, Special Projects Conference Management Center, 445 West Main St., Wyckoff, N.J. 07481.

Network World Sales Offices

BOSTON
Donna Pomponi
375 Cochituate Rd.
Box 9171
Framingham, MA 01701-9171
(617) 879-0700

WASHINGTON, D.C.
Bill Burke
2133 Defense Highway
Suite 205
Crofton, MD 21114
(301) 721-4763

ATLANTA
Tom Tolbert
1400 Lake Hearn Dr.
Suite 330
Atlanta, GA 30319
(404) 394-7509

LOS ANGELES
David Pronenko
18004 Sky Park Cir.
Suite 100
Irvine, CA 92714
(714) 250-3006

NEW YORK/PHILADELPHIA
Joan Daly
Paramus Plaza 1
140 Route, 17 North
Paramus, NJ 07652
(201) 967-1350

SAN FRANCISCO
Chris Clyne
3350 West Bayshore Rd.
Suite 201
Palo Alto, CA 94303
(415) 328-4618

CHICAGO
Fran Jonikaitis
2600 South River Rd.
Suite 304
Des Plaines, IL 60018
(312) 827-4433

CLASSIFIED ADVERTISING
Joan Bayon Pinsky
375 Cochituate Rd.
Box 9171
Framingham, MA 01701-9171
(617) 879-0700

Network World Headquarters

375 Cochituate Road, P.O. Box 9171
Framingham, MA 01701-9171
Phone: (617) 879-0700, Telex: 95-1153, FAX: (617) 875-8931

Ron Mastro
National Sales Director

Pam Valentinas
Manager/Marketing & Sales Operations

Karen Wallace
Account Coordinator

PRODUCTION **Production Director,** Peter Holm, **Senior Production Manager,** Leigh Swearingen, **Production Assistant,** Christopher P. Cuoco
CIRCULATION **Corporate Distribution Manager,** Robert W. Wescott, **Circulation Manager,** Richard Priante

Network World is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes over 80 computer publications in more than 28 major countries. Fourteen million people read one or more of the group's publications each month. Members of the CWCI group contribute to the CW International News Service offering the latest on domestic and international computer news. Members of the group include: ARGENTINA'S *Computerworld/Argentina, PC Mundo;* ASIA'S *Asian Computerworld Hong Kong, Computerworld SE Asia;* AUSTRALIA'S *Computerworld Australia, Communications World, Australian PC World, Australian Macworld;* AUSTRIA'S *Computerwelt Oesterreich;* BRAZIL'S *DataNews, PC Mundo, Micro Mundo;* CHILE'S *Informatica, Computacion Personal;* DENMARK'S *Computerworld Danmark, PC World Danmark;* FINLAND'S *Tietoviikko, Mikro;* FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Le Monde Des Telecoms;* GREECE'S *Micro* and *Computer Age;* HUNGARY'S *Computerworld SZT, Mikrovilag, Tudomany;* INDIA'S *Dataquest;* ISRAEL'S *People & Computers Weekly, People & Computers Monthly;* ITALY'S *Computerworld Italia;* JAPAN'S *Computerworld Japan;* MEXICO'S *Computerworld Mexico;* THE NETHERLAND'S *Computerworld Netherlands, PC World Netherlands;* NEW ZEALAND'S *Computerworld New Zealand;* NORWAY'S *Computerworld Norge, PC World Norge;* PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld, China Computerworld Monthly;* SAUDI ARABIA'S *Arabian Computer News;* SOUTH KOREA'S *Computerworld Korea, PC World Korea;* SPAIN'S *Computerworld Espana, Commodore World, PC World Espana, Communicationes World, Informatica Industria;* SWEDEN'S *ComputerSweden, Mikrodatorn, PC World;* SWITZERLAND'S *Computerworld Schweiz;* UNITED KINGDOM'S *Computer News, DEC Today, ICL Today, PC Business World, Lotus UK;* UNITED STATES' *Amiga World, Boston Computer News, CD-Rom Review, Computerworld, Computers in Science, Digital News, Federal Computer Week, 80 Micro, FOCUS Publications, inCider, InfoWorld, MacWorld, Micro Marketworld, Network World, PC World, Portable Computer Review, Publish!, PC Resource, RUN;* VENEZUELA'S *Computerworld Venezuela;* WEST GERMANY'S *Computerwoche, PC Welt, Run, Information Management, PC Woche.*

PRODUCT REVIEW

Wrap boxes don't always rap

BY JOHN J. HUNTER
Contributing Writer

Codex Corp., General DataComm, Inc. (GDC) and Racal-Milgo, Inc. want to be your network management vendor. It doesn't matter if you're not using their diagnostic modems; now everyone is welcome. Unfortunately, using another vendor's modem is not all that it's cracked up to be. You'll have to live with some trade-offs, especially in the analog test measurement area.

For years, Codex, GDC and Racal-Milgo have held high marks among users of their network management systems. Architecturally, the network controllers used by these three vendors are the same in that they comprise central or distributed control sites that monitor data terminal equipment (DTE), data communications equipment (DCE) and communications line facilities for malfunctions.

These products were designed, however, to work only with their diagnostic modems that have integrated capabilities for detecting network malfunctions and reporting them back to the central site through low-speed secondary channels. Those modems can respond to directions from the central controller as well.

Of late, all three vendors have modified their stances regarding modem exclusivity, and they now allow the use of other vendors' modems in their networks. This is accomplished by employing a wrap box, which bridges the modem on the DTE and DCE side of the line and monitors the digital and analog transmission components for any problems. Wrap boxes provide the same functionality to independent modems as is available with diagnostic modems.

Three net managers unwrapped

The Codex 4840, GDC's NMC-70 List 8 and the Racal-Milgo CMS 2061 accept wrap boxes. These units are aimed at small and medium-sized networks employing multidropped and multinode network configurations with low data transmission speeds. The Codex unit tops out at 19.2K bit/sec, regardless of the modem used, while the Racal-Milgo system supports 16.8K bit/sec for its Omnimode modems and 16K bit/sec with wrap-box modems. GDC's top transmission rate when its diagnostic modems or wrap boxes are used is also 19.2K bit/sec, but the NMC-70 can also be configured to handle networks with 64K bit/sec channel service units attached.

All three network management systems accommodate point-to-point and multipoint (multidropped) circuits, and all provide analog and digital loop-back tests using a built-in bit-error rate tester to generate test data that's looped back and compared at the control site. All units also allow modems, including wrap-box units, to initiate self-tests. In addition, the network manager will isolate a defective modem and switch in a hot spare when a primary modem fails.

Where these products differ is in the level of component isolation. While Codex and GDC can isolate and remove a streaming terminal from the configuration and put its associated modem back on line, the Racal-Milgo unit cannot. The modem must be removed as well, depriving the primary circuit of its services. This could be a problem if the modem is being shared by more than one terminal device. And by removing the modem, the network operator won't be aware when the isolated terminal has been repaired and returns on line.

The modem disconnection procedure also differs among the units. With Codex and Racal-Milgo, the disconnect can be manual or automatic. The GDC unit requires manual intervention. If the operator isn't present when a failure occurs, this could cause a disruption. Fortunately, users can set an audible alarm on the GDC unit, and the other two as well, when such a condition occurs.

Three network management systems compared

	Vendor/Product		
	Codex Corp. Canton, Mass./ Codex 4840	General DataComm, Inc. Middlebury, Conn./ NMC-70	Racal-Milgo, Inc. Ft. Lauderdale, Fla./ CMS 2061
Lines/devices supported	248/2,200	1,024/32,768	256/65,280
Device isolation level	Terminal	Terminal	Modem
Auto fallback	Manual*	Manual	Manual
VF monitoring with wrap boxes		Limited	
Price with wrap boxes/diagnostic modems	$105K/NA	$180K/338K	$164K/$471K

* Automated if 2600 Series modems are used

SOURCE: TMS CORP., DEVON, PA.

Should the communications line deteriorate to the point where primary data transmission rates cannot be sustained, all three network managers support autofallback operation, but it must be operator initiated. The only exception is when the Codex 4840 is configured with that vendor's 2600 Series modems. With autofallback technology so well understood, it's puzzling that all vendors' modems used with these network managers don't accommodate it. There's little point in allowing a modem to continue operating at a transmission rate that's producing many errors.

A plus for Codex is the way it handles channel reconfiguration when a multiplexer is attached to a modem that's had its transmission speed reduced. With Codex's network manager, the operator can issue one command to reconfigure all multiplexer channels simultaneously. By contrast, the GDC and Racal-Milgo products require that each channel be individually reconfigured. That takes time, during which the multiplexer is either not in operation or is performing in a degraded mode.

Autodial backup is an operator-initiated function for all three products. The only exception is for the Codex 2600 Series modems. The Codex 4840, GDC NMC-70 and Racal-Milgo 2061 do a commendable job of monitoring for EIA RS-232C control signal problems, regardless of whether their diagnostic modes or wrap boxes are used. Unfortunately, all vendors don't support the wrap boxes uniformly in their ability to measure all control signals. For example, the Codex 4840 wrap box doesn't detect clear to send off, and the Racal-Milgo box doesn't support data terminal ready off. GDC's wrap box supports all control signals.

All the wrap boxes come up empty when the analog components of the communications network are being measured. With the exception of the NMC-70, which measures line-level loss and signal-to-noise level ratios, none of the wrap boxes provide any analog measures. When the three vendors' diagnostic modems are employed, however, a full complement of analog transmission line impairments is measured.

The reason for that discrepancy rests with the data measuring circuits contained in the diagnostic modems, which send signal-level data to an eye-pattern generator located at the network central site controller. The generator compares the signal passing through the modem with what the data-encoded bit-pattern constellation should look like. Deviations show up in a shift in the dot pattern from the reference points on the eye-pattern generator's display. The eye-pattern generator shows the cause of the problems, but in no way quantifies it. In addition to providing test and management services, all three products maintain an inventory of all network components and keep an historical file of past problems for each component. This history file makes trends in the network easy to detect. The network management equipment also shows current alarm status by indicating those alarms solved and those still open. Codex and GDC also issue trouble tickets, printed indications that a problem exists, which Racal-Milgo does not offer.

Based on overall capabilities, the GDC NMC-70 looks like the network manager to beat. It handles small and medium-sized networks, supports all important RS-232-C signal measurements and provides line-level loss and signal-to-noise ratio measurement to users.

However, none of these products perform well in providing quantified measurements of analog-line problems. With leased lines, carriers maintain a certain level of performance, for which users pay a premium. As most systems managers are aware, carriers aren't as vigilant as users would like in keeping lines within specification.

Further, the people at the carrier technical control centers may have different views as to whether or not a line is providing acceptable performance. For that reason, it's wise to be able to quantify how far a line is out of specification in order to convince the carrier. An eye-pattern generator doesn't provide those measures, but a number of relatively inexpensive analog test monitors do ("Network test equipment puts the finger on faulty lines," *NW*, Feb. 16).

Pricing

To determine prices, *Network World* specified a 40-line network with 120 drops operating at 4,800 bit/sec. Prices were requested for managers with wrap boxes only (no third-party modem prices are included), and managers with just diagnostic modems. Prices reflect single-unit purchase and only one operator station. Users who wish to purchase an analog monitor to supplement the eye-pattern generator should figure on spending anywhere from $8K to $15K for each monitor. Since those units generally work in pairs, at least two will be needed.

Codex declined to quote a price for a system employing its diagnostic modems. However, the price of the basic 4840 is $92,500, and each model 2620 modem — the type recommended for the 4840 — is $2,190 for a single-channel unit and $2,690 for four channels. Without knowing the number of modem control units employed to poll the benchmark network, it's impossible to accurately determine the price of the network. Keep in mind that most analog test equipment disrupts communications, while the analog test facilities of these three network management systems do not.

Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.

We do T1 by the Book.

Introducing the completely compatible CP2000 T1 digital termination from Granger.
It amazes us that some companies try to sell T1 products that aren't network compatible.

We don't know what they expect you to do with them, but we hope it doesn't have anything to do with communications.

The new Granger CP2000 digital termination is compatible with AT&T's standards for their Accunet® services, along with a dictionary of other standards: ESF, CCR, T1Y1, B8ZS, M24, M44, SNA, RS-232, SS #7 and on and on.

Just as important, the CP2000 is ISDN compatible. That makes it an excellent way to ensure the network you design today won't be locked out of the technology developed tomorrow.

Granger's commitment to compatibility is why our client list already reads like a who's-who of long-haul carriers, telephone operating companies and private networks.

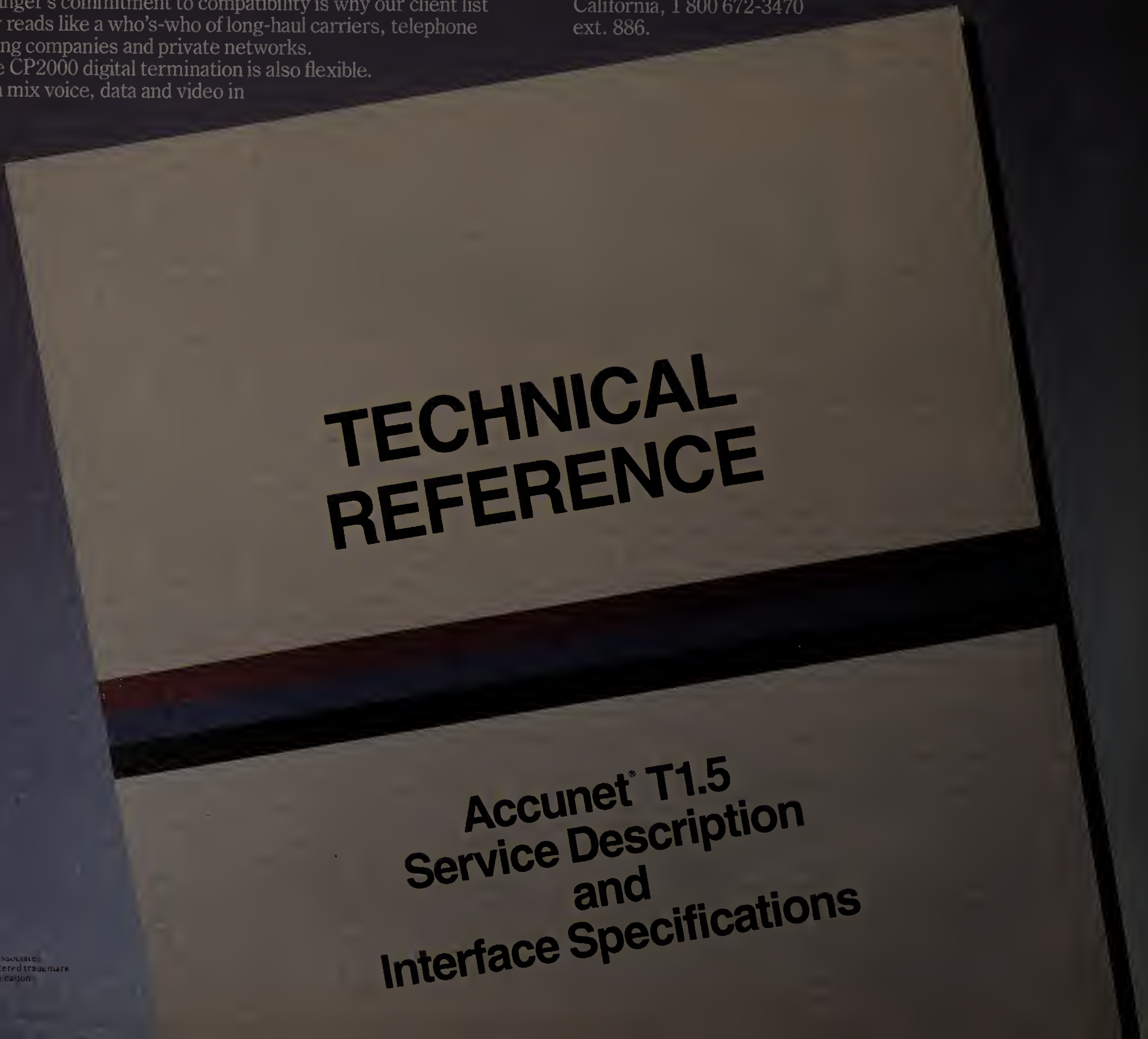
The CP2000 digital termination is also flexible. You can mix voice, data and video in any combination, then reconfigure the mix automatically whenever you want. That's an important part of controlling your own communications network. Which is what T1 is all about.

To keep that information clear and accurate over long distances, you can add echo canceling.

To make your network more efficient, you can add ADPCM voice compression and double the amount of voice traffic you can carry.

And to find out more about what our completely compatible new CP2000 digital termination can do, you can write Granger Associates, 3101 Scott Blvd., Santa Clara, CA 95054-3394. Or, call us. Outside California, 1 800 538-8157 ext. 886. Inside California, 1 800 672-3470 ext. 886.

Granger Associates



© 1986 Granger Associates
Accunet is a registered trademark
of AT&T Communications